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ABSTRACT

This document contains a series of population learning activities designed to supplement a K-12 curriculum. The activities are interdisciplinary in nature and include topics in science, mathematics, social studies, language arts, fine arts, and home economics. Besides a division of activities according to grade and subject matter, the activities are also grouped by population concept. Each activity includes a reference to the environmental education program from which it was taken as well as a stated purpose and methods section. Also included in this publication are pre-post factual and attitudinal tests, a basic glossary of population terms, and an annotated list of resource materials that includes: teaching materials, background readings for teacher and student, readings for students in grades 3-12, audio-visual materials and their sources, and rental information. (BT)

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Population Education Activities for the Classroom

ED141178

Selected and Developed by
Judith M. Schultz
and
Herbert L. Coon

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SE 022 707

POPULATION EDUCATION ACTIVITIES FOR THE CLASSROOM

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ENVIRONMENTAL EDUCATION INFORMATION REPORTS

Environmental Education Information Reports are issued to analyze and summarize information related to the teaching and learning of environmental education. It is hoped that these reviews will provide information for personnel involved in development, ideas for teachers, and indications of trends in environmental education.

Your comments and suggestions for this series are invited.

John F. Disinger
Associate Director
Environmental Education

Sponsored by the Educational Resources Information Center of the National Institute of Education and The Ohio State University.

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INTRODUCTION

As the size and complexity of contemporary problems facing humankind continue to enlarge, it becomes more critical for teachers to provide an education for their students which is both problem-solving and inter-disciplinary in nature. The current United States and world population dilemmas provide excellent opportunity and challenge to meet these educational needs. Indeed, knowledge about population dynamics should be considered an essential requisite in the educational background of any educated person.

Many educators in the past have neglected population education and other areas of inquiry, suggesting that they do not fit into the already overcrowded curriculum or that they are value-laden. However, in reality, every topic for educational discussion is value-laden and should be approached by open, objective inquiry. Since value exploration leads to values-clarification, it is the teacher's responsibility to assist students in dealing with the formidable problems which so intimately affect their personal and collective lives and decision-making. Beyond the personal level and immediate circumstances, such problems will perhaps more importantly have impact upon their future and that of future generations.

Values as related to personal population decisions are formed through the home, the school, peer groups, and the media. It is the intention of this publication to provide activities which assist students in clarifying values and providing factual information by which decisions can be made.

Since the overcrowded curriculum is a reality, there probably will be few opportunities to introduce mini-courses in population. Where such courses are possible, a wealth of information and activities is available for teacher use. In most cases, however, teachers will find it desirable to incorporate Population Education modules or activities into existing courses, or to teach traditional concepts utilizing population education approaches. Thus, the orientation of this publication has been primarily to assist the teacher working in the latter situation. Extensive, selected, annotated audio-visuals and student/teacher references are suggested for expanding foundations and going beyond the scope of this resource booklet.

The introductory list of goals and concepts clearly demonstrates the interdisciplinary nature and the sense of urgency of Population Education. In the past teachers have lost the interest of students by presenting lectures on dull demographics in an attempt to cover chapters on social studies or geography. It is the intent of this publication and its selected references to indicate that the new field of Population Education is process-education of a "hands-on" type, urging active involving of the students in the learning process. This methodology more closely approximates the real-life immersion in which students will find themselves in terms of the population dilemma.

Many students at the elementary and secondary age levels are not yet directly affected by societal population pressures. Thus, the challenge

of the teacher is to utilize creative educational activities to assist students in projecting beyond their immediate age, experience, or situation. The activities suggested herein attempt to provide such opportunities for teacher and student. Yet they are not meant to provide the "end-all" answer. Resources, both written and audio-visual, have been included so that the effective teacher might launch off from this publication and experiment in a creative way.

***

Growth cannot continue indefinitely given the confines of the finite system, planet earth, and its finite resources. Thus, the only questions remaining are how and when population growth will stabilize. The educational system carries an important responsibility for helping students perceive the problems created by population change and how to act in a responsible way to obtain accurate information about these changes and his/her personal experiences.

Population size in the world changes by the increasing of birth rates or death rates. With respects to individual nations net migration rates are also critical. Historically, famine, disease, war, plague, pestilence, macro-evolutionary environmental change, and self-regulating behavioral mechanisms have been known to regulate population size. More recently, the effects of the agricultural, scientific-medical, and industrial revolutions have produced "death control", or a great shift downward in death rates. This has been responsible for rapid growth of world population.

While birth rates have moved continually downward since the beginnings of the United States as a nation, the current momentum of the U.S. population growth will allow it to grow for at least an additional 70 years in the future. U.S. population has in fact potential for future growth greater than that of almost any other developed nation due to early marriage and child-bearing, and the large percentage of post-World War II baby boom youth in their reproductive years. In fact, the decisions made by this age group and those who follow will determine the future course of U.S. population growth and the impact of that growth upon social services, the economy, resources, environmental pollution, land use, energy needs and many other related problems.

***

There are two kinds of population problems in the world. The developing nations are those characterized by low degrees of industrialization, primitive agriculture, low per capita income, inadequate diet, low literacy levels, high birth rates and recent decrease in death rates. In the developed nations, adequate diets, high literacy levels, industrialization, and high per capita income have resulted in low birth rates and death rates. For developed nations, the population problem can be identified by a majority class (middle/upper class white) per capita stress on global resources and pollution. For developing nations the problem is sheer numbers surviving at bare subsistence levels. At current comsunption rates,

30 Indians appear to have the same impact upon resources and environment as one American. Based upon knowledge of our delicate life support system on planet earth, over-population might be better defined in terms of "carrying capacity".

The U.S. has a problem which can also be identified as one of population distribution. Suburban sprawl over productive farmland, as is presently occurring, could result in diminished quantity and quality of food. U.S. farmers are 1% of the world's total, but produce 25% of the world's grains. Thus, reduction of U.S. farmland could have world-wide implications.

When the birth rate is equal to the death rate in a population (assuming no net migration) zero population growth or a stabilized population is achieved.

$$\left(\frac{\text{BIRTHS}}{1000 \text{ population}} + \frac{\text{DEATHS}}{1000 \text{ population}} + \text{net migration} = 0\right)$$

During 1973 the birth rate (U.S. Census Bureau) was 15.2/1000 and the death rate was 9.4/1000. Thus $\frac{15.2}{1000} - \frac{9.4}{1000} = 0.58\%$ rate of natural increase.

During this same year, the U.S. population size was 210 million (215 million in 1976). Thus the net natural increase was .0058 x 210,000,000 or 1.22 million. However, 400,000 immigrants were also added, causing the final increase to become 1.6 million individuals. The United States continues to grow by over 1-1/2 million persons annually. (This figure does not consider illegal immigrants.)

Currently, the average family size is 1.8 children. This is below what is called "replacement level" of 2.1 children replacing the parents. However, these "average" family size figures are comprised of childless couples and single individuals, and families with 2 or more than two children. If U.S. population size were to stabilize before reaching the year 2040 and an additional 70 million more Americans, the average family size would have to shift downward from the current 1.8 used to compute such a projection. Thus, the mix of life style options would have to contain more individuals or couples remaining childless or choosing one child families as opposed to two or more. The reverse would be true if the U.S. wished to add 70 million more Americans by an earlier date.

Age structure of populations are an additional important consideration. The post-World War II baby boom between years 1947-1970 produced an unprecedented number of women in their reproductive years at the present time (age 16-29 in 1976). This group has produced many more births than this age-group usually would, simply because of its size. Employment, housing, social security, and other geriatric-associated services may be the legacy of population-associated problems for this age-group in the future.

The population of the U.S. is not at all close to zero population growth. While the average women reduced fertility from 3.64 children in 1960 to

2.5 children in 1968, to 2.03 in 1973, the below replacement level figure is over-compensated for by both immigration and the size of the post-World War II generation.

The aforementioned facts present a summary profile of the U.S. and world population situations and associated problems. It remains for the creative teacher to begin with this publication and to go beyond in providing students with this important component of their educational background.

Judith M. Schultz

Herbert L. Coon

January 1977

CONCEPTS IN POPULATION EDUCATION*

1. Population changes in the United States and other nations affect the individual and society as related to:

   a. Resource demand and depletion
      Pg. 79, 92, 159
   b. Provision of social services
      Pg. 83, 109
   c. Pollution
      Pg. 81
   d. Land use
      Pg. 18, 86, 87, 91, 104
   e. Individual and group expectation and conflict
      Pg. 8, 25, 31, 34, 43, 62, 75, 88, 145
   f. National economy
      Pg. 135
   g. Stability of the political system
      Pg. 136
   h. Health
      Pg. 55, 153

2. Personal and collective decisions and actions can change the size and character of populations as related to:

   a. Timing of marriage/child bearing
      Pg. 82
   b. Fertility planning/birth control
      Pg. 121, 124, 127, 129, 138, 140, 142, 146, 156, 160
   c. Geographical dislocations
      Pg. 13, 50, 53, 74, 116, 119, 148
   d. Changes in immigration
      Pg. 56, 110, 133, 152
   e. Attitudes toward marriage and child-bearing
      Pg. 37, 60, 63, 71, 94
   f. Numbers and types of roles available to men and women
      Pg. 6, 49, 101, 134
   g. Formation of governmental policy
      Pg. 105

3. Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including:

   a. Graphical representation of data
      Pg. 113, 117
   b. Distinguishing between empirical and value statements
      Pg. 164
   c. Understanding demographic terms and phenomena
      Pg. 5, 7, 10, 15, 16, 19, 20, 29, 39, 40, 45, 46, 53, 132, 154

*Page numbers following each concept locate activities designed to help develop the idea.

4. Struggles of many families and nations to develop economically are prolonged and made more difficult by rapid population growth.
   Pg. 66, 99, 162

5. As more people make use of dwindling resources, greater social and political regimentation results.
   Pg. 4, 67

6. Political instability seems probable as long as a few nations consume a disproportionate share of the earth's finite supply of resources, including food.
   Pg. 12, 69, 7

7. Carrying capacity caused by the interaction of population growth, resources, and technology is reached and often exceeded whenever pollution is indicated.
   Pg. 41, 59, 72, 143, 149

8. The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a fin'te system cannot accommodate these increases indefinitely.
   Pg. 3, 9, 14, 22, 27, 32, 47, 51, 52, 57, 64, 97

9. The population explosion is largely due to reduction in the death rate.
   Pg. 35, 54

10. The rate of population growth differs significantly between developed and less-developed countries.
    Pg. 150

11. Achieving a stabilized population takes a long time. An average replacement level of 2.1 children will not result in a short-term stabilization of population. Zero population growth rate is not necessarily equated with a stabilized population.

x

BREAKDOWN OF ACTIVITIES BY CATEGORY

(Some activities fall into more than one category in each area.)

	Category	Number of Activities
Grade Level:	Elementary	10
	Elementary-junior high school	14
	Elementary-junior-senior high school	8
	Junior high school	10
	Junior-senior high school	43
	Senior high school	18
Subject Area:	Social Studies	92*
	Science	39
	Mathematics	18
	Home Economics	17*
	Language Arts	6
	Art	2

*Many activities listed as appropriate for use in conventional Social Studies and/or Home economics classes could be studied even more effectively in less conventional classes such as "Marriage and the Family". The writers urge strongly that more junior and particularly senior high schools offer such courses.

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POPULATION EDUCATION

ACTIVITIES

PURPOSE: To examine the need to control animal populations.

LEVEL: Elementary school

SUBJECT: Social Studies

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increasees indefinitely.

ACTIVITY: Arrange to have a child and/or parent bring to class a dog or cat and large litter (four or more) of puppies or kittens. Ask the owner(s) to talk about "the new family"--how they like them, problems of feeding them, problems of caring for them, expenses associated with giving them "shots" and so forth. Provide plenty of time for the children to touch or handle lovingly the baby animals.

Consider, with the owners, whether they plan to keep all of the offspring. Are they planning to sell some or give some away to friends? Could the mother animal have another litter within a year or so? Will she? If not, why not? Is it possible to have too many dogs or cats? Have the children seen stray dogs or cats that don't have a home? What happens to homeless animals in the country? In the city?

PURPOSE: To illustrate varied perceptions of crowding.

LEVEL: Elementary school

SUBJECT: Social Studies
Science

CONCEPT: As more people make use of dwindling resources, greater social and political regimentation results.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 51.

ACTIVITY: Experience crowding yourself. Pretend that your classroom represents the whole world right now, and spread everyone out in it.

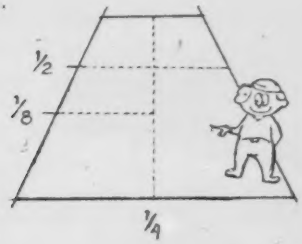
Now imagine that it is 2005 and the population has doubled. Have everyone move into one half of the classroom. Now the population density in that half is twice as great as before.

Pretend it is now 2040 and have everyone move into one fourth of the classroom. Is it starting to get crowded?

Continue by pretending it is now . . .

2075 - and using one eighth of the classroom.
2110 - and using one sixteenth of the classroom.

How many "doublings" before you have to quit? What density do you prefer?



PURPOSE: To assist students in understanding cumulative effects of population growth.

LEVEL: Elementary school

SUBJECT: Social Studies
Science

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: George E. Utter, Sixth Grade Teacher, Princeton City Schools, Cincinnati, Ohio.

ACTIVITY: Make a circle on the floor with a 25' string representing the earth. Have four children step into the ring. They represent their grandparents in 1930, when the population was about 2 billion. Have them each choose another child to enter the ring. The children represent the doubling which has taken place in the past 45 years. (The world population today, 1976, is 4 billion.) Each child in the ring chooses another child to bring the total to 16 children. This represents a doubling of population in the next 35 years, or the year 2010.

While students are standing in the circle (no shoving, please) discuss how each group felt as another group moved onto the "earth". Discuss aspects of space, air, water, and food for each person on this make-believe earth. Discuss what land is available for food production, recreation areas, living areas, etc. This is a good way to emphasize the importance of population control.

PURPOSE: To examine reasons underlying stereotypic vocational roles.

LEVEL: Elementary school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to numbers and types of roles available to men and women.

ACTIVITY: Ask the class to think about the qualities necessary to become a successful physician, engineer, and lawyer. Develop on the chalkboard, under each profession, the qualities suggested by the children such as "smart", patient, understanding, willing to work hard, and so forth.

Ask the children to identify the sex of their family physician. How many are men? How many are women? Typically men physicians will predominate overwhelmingly. Indicate to the class that men, also, dominate greatly the engineering and legal professions.

Divide the boys and the girls in the class into three groups each. Ask one group of boys and one group of girls to prepare arguments defending or opposing the predominance of men physicians. Use the same plan to examine the reasons for small numbers of women in engineering and law. Ask each group to present their arguments to the entire class for review/reaction. Finally, ask each member of the class to "vote" or to write his conclusion and reasons on whether it would be a good idea to have more women in professional fields such as medicine, engineering, and law.

PURPOSE: To examine population trends in a community.

LEVEL: Elementary school

SUBJECT: Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

ACTIVITY: Ask two or three children to take responsibility for the following example of population growth in their city or community.

Obtain and place in a prominent location in the classroom a clear glass container. Half fill the container with an equal number of small white and dark objects such as beans. The beans are to represent the present population of the city or community.

Ask the committee of children to secure from the daily newspaper or other regularly issued source the daily births and deaths found in the vital statistics section. For each death remove from the container a dark bean. For each birth add a white one. Over a period of several days or weeks (depending upon the size of the city or community for which data is obtained) is the population growing or decreasing? What other factors might be affecting the size of the city? How could the "experiment" be improved and made more accurate?

PURPOSE: To clarify impressions related to population growth.

LEVEL: Elementary school

SUBJECT: Social Studies
Science

CONCEPT: Population changes in the United States and other nations affect the individual and society in many ways.

ACTIVITY: Ask the students on different occasions to make individual collages, or to form them collectively as a class. Sources are newspaper and magazine clippings.

Key words such as the following may serve as an orientation for each collage, as well as a point from which to launch discussion:

1. Crowd
2. Family
3. Birth
4. Death
5. Population growth
6. Resource use
7. Roles of women
8. Roles of men
9. Congestion
10. Pollution

PURPOSE: To illustrate "limits to growth".

LEVEL: Elementary school

SUBJECT: Language Arts
Social Studies
Science

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 51.

ACTIVITY: Present the following beginning of a true story:

> Once upon a time there was a space ship with three million people on it. Many of these people were married and wanted children.
>
> It had a limited amount of oxygen, water, fuel, food, etc.

Can you finish the story?

PURPOSE: To develop an understanding of numerical values associated with population growth.

LEVEL: Elementary school

SUBJECT: Mathematics

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

ACTIVITY: Present to the class the following type of exercises developed in an unpublished paper by Kathy Shordt.

Multiplication (Fractions)	One third of the Earth's surface is land. People live on one-half of the land. People live on what fractional part of the Earth's surface? (Answer: one-sixth)
Division (Money)	All nations in the world spend more than 300 billion dollars each year for military purposes. There are about 4 billion people in the world. How much money is this for each person on earth? (Answer: $75.00)
Division (Money)	Napoleon has saved $5.94. He is going to buy 6 presents--for his mother, father, and four sisters. Each present costs the same. How much does he spend on each present? Do the same, only pretend that Napoleon has a mother, father, and only one sister. (Answers: $0.99 and $1.98)
Division (Decimal Answer)	140 million tons of pollutants are put into the atmosphere each year in the United States. There are about 200 million people in the U.S. How many tons is this for each person? How many pounds? (Answers: .75 tons or 1,500 pounds)
Repeating Decimals	Density of population is the number of people living in a unit area. If 100 people live in 10 square miles, how many live in one square mile (on the average)?

From: Kathy Shordt. Modern Mathematics Exercises in Population Dynamics. September, 1962.

New York City has a population of about 8 million people who live in 300 square miles.
What is the population density per square mile?
(Answers: 10 people per sq. mi. and 26,667 people per sq. mi.)

Your rich uncle has just died and left you $1 billion. But if you accept the money you must count the money for eight hours a day at the rate of $1 per second. When you are finished counting, the $1 billion is yours and then you may start to spend it.

Do you accept your uncle's offer? _____

Why or why not? _____

How old will you be when you are finished counting and are able to start spending the money? _____

Work space:

How long would it take you to spend $1 million at the rate of $1,000 per day? _____

How long would it take to spend $1 billion at the same rate?

_____

If you started spending the $1 billion at the rate of $1,000 per day in the year 1 A.D., how many more years would you be spending it?

_____

Work space:

PURPOSE: To understand the unequal distribution of population and food production in the world.

LEVEL: Elementary school

SUBJECT: Social Studies

CONCEPT: Political instability seems probable as long as a few nations consume a disproportionate share of the earth's finite supply of resources including food.

REFERENCE: Teaching Population Concepts. Pat King and John Landahl, 1973. Supt. of Public Instruction, State of Washington, Olympia, Washington 98504.

ACTIVITY: In a class of 25 children ask each child to represent 1/25 of the world's population or about 160,000,000 persons. Ask two children to stand up to represent the total population of North America (U.S.A., Mexico, and Canada). Ask fourteen children to stand up together to represent the Asian population, five to represent Europe, two to represent Africa, and two for Latin America.

Divide among the groups 25 penny candies according to the proportion of the world's food supply that each continent produces. Eight candies to the fourteen children representing Asia, eight to the five children representing Europe, seven to the two representing North America, one candy to Africa, one to Latin America.

For the next several days have the children "draw out of a hat" the continent they will represent for that day according to the proportion cited in the first paragraph above. Before recess break have them assemble into their respective continent groups and distribute the candies as described previously.

How do the Asians regard the North Americans? Should the North Americans share some of their candy? Why or why not? What, if anything, can the Asians do about this condition? What can the Americans do?

PURPOSE: To contrast life styles in crowded vs. uncrowded environments.

LEVEL: Elementary school

SUBJECT: Language Arts
Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

REFERENCE: Adapted from activity by Georgia E. Utter, sixth grade teacher, Princeton City Schools, Cincinnati, Ohio.

ACTIVITY: Utilizing cassette tape recorders, have a student or small group of students prepare a tape about three minutes in length of some sounds along a lonely country road (crickets, lonely dog howling, distant voices, water flowing by, etc.). Have students prepare three minute tapes of city sounds at a busy intersection (cars, trucks, emergency vehicle, etc.). Play the contrasting tapes to the class. Allow students to make comparisons both by discussion and in writing as related to density settlement of human populations and to provide reasons for preferences for which environment the student would wish to live in and why. What limits their free choice? The emotional contrasts experienced in this exercise should assist in values clarification as related to population distribution and density.

PURPOSE: To sense nature's enormous reproductive power.

LEVEL: Elementary-junior high school

SUBJECT: Mathematics
Science

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

ACTIVITY: Working in pairs have each group find and bring into class a mature dandelion head. Count and record the number of seeds it contains. Record the data from each group on the chalkboard and calculate the average number of seeds found in one head.

Assuming that all seeds can grow and produce dandelion plants, how many descendants are possible in four generations from this one head of seeds?

Why isn't the entire world covered with dandelions? What factors limit the number of animals, such as rabbits, that can survive? What factors might or do limit the number of human beings that can live on earth?

PURPOSE: To assist students in assimilating the large numbers associated with population size.

LEVEL: Elementary-junior high school

SUBJECT: Mathematics
Science
Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts, by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 39. (Activity suggested by Jeanette Furness.)

ACTIVITY: To help students understand the large numbers often used in talking about population, have them figure out how big a lawn containing one million blades of grass is. They can do this by each counting the number of blades of grass in a square inch of lawn and working out an average. Multiply this number by 144 to calculate the number of blades in a square foot. Divide the number of blades in a square foot into one million to calculate the number of square feet needed. About how long and how wide would a patch of lawn containing this number of square feet be? Stake it off on the lawn. If this is the size of a lawn containing one million blades of grass, how big would a lawn containing one billion blades be, if a billion is one thousand times one million?

PURPOSE: To develop comprehension of fertility potential and doubling time.

LEVEL: Elementary-junior high school

SUBJECT: Science
Mathematics
Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 29. (Activity suggested by LeVon Balzer.)

ACTIVITY: Often, younger students can better grasp concepts by first discussing plant and animal populations. You might discuss the limiting factors that control plant and animal populations and what would happen if there were no limiting factors. For instance:

Female codfish lay nine million eggs a year, 1/2 males, 1/2 females. If all the females lived to produce, at the end of the second year there would be 40,500,000,000,000 codfish. In a few years the ocean would be so full of codfish there would be no room for water.

If all the eggs laid by one mosquito lived and produced young, in three months there would be over 100,000,000,000,000,000,000,000 mosquitos from this one female alone.

Plants also reproduce rapidly. On six square feet, a scientist once found 357 plants that grew from seeds.

Some bacteria divide in two in less than 1/2 hour. In 2-1/2 days, the offspring of just one bacterium, if they all lived, would fill the ocean.

A discussion of how plant and animal populations are kept under control can lead to how the human population has been controlled in the past--and how it might be kept in balance in the future.

PURPOSE: To demonstrate population/space relationships.

LEVEL: Elementary-junior high school

SUBJECT: Science
Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 36. (Activity suggested by Geraldine Cox.)

ACTIVITY: If you teach in a school in which part of the playground is a natural area, this exercise will help pupils discover that loss of the natural environment is a population-related problem. Give each student a piece of string long enough to enclose an area about the size of his or her bedroom at home. (Recycle the string!)

Take the students outdoors into the natural area and have them each lay out a square with the string wherever they would like their own house to be. Explain that they may use the entire area, but that no "houses" may overlap.

When everyone has finished, have the entire class walk around the "built-up" area. Then return to the classroom. Discuss how many trees would have to be cut down to make room for the students' houses. Lead the pupils to relate this situation to what happens when population increases and people need homes. Where do they then go for outdoor recreation and to enjoy nature? Will they each have a home of their own someday?

PURPOSE: To demonstrate the concept of "human population explosion".

LEVEL: Elementary-junior high school

SUBJECT: Social Studies
Home Economics
Mathematics
Science

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 52.

ACTIVITY: Present to the class the historic pattern of world population growth shown below. Involve the class in graphing the figures on the classroom blackboard. If the blackboard is 25 feet long, let 3 feet equal 1,000,000 years. One inch will equal about 30,000 years. If your blackboard is longer or shorter adjust the scale accordingly. Do you think the term "population explosion" is a good one to use in describing this graph?

WORLD POPULATION GROWTH

It took from...	For earth's population to reach...
the beginning of man to the Neolithic age	7,990,000 years to reach 10 million
Neolithic to the Birth of Christ	10,000 years to reach 300 million
Birth of Christ to the days of Columbus	1,500 years to reach 500 million
Columbus to 1850 A.D.	350 years to reach 1 BILLION
1850 to 1925 A.D.	75 years to reach 2 BILLION
1925 to 1962 A.D.	37 years to reach 3 BILLION
1962 to 1975 A.D.	13 years to reach 4 BILLION
and will take to 1982	7 years to reach 5 BILLION

PURPOSE: To illustrate concepts of population growth rates and doubling rates.

LEVEL: Elementary-junior high school

SUBJECT: Mathematics
Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 47.

ACTIVITY: If you subtract the death rate (yearly deaths per 1,000 people) from the birth rate (yearly births per 1,000 people) and divide by ten, you get the population growth rate.

This table shows how long it takes a population to double at different rates of growth.

Growth Rate (Percent)	No. of Years to Double Population
1.0 (U.S. rate)	70
2.0 (world rate)	35
3.0	23
4.0	18

In the imaginary country of Sonobia, the human population is 10,000. During the last year 200 babies were born and 100 people died. What is the growth rate and how long will it take for the population to double?

Birth rate per 1,000 of population _____

Death rate per 1,000 of population _____

Growth rate per 1,000 of population _____

Years to double population _____

Remember to convert your answer to a decimal and refer to the chart to find out the number of years it takes to double a population.

PURPOSE: To illustrate exponential growth, or growth through several human generations.

LEVEL: Elementary-junior high school

SUBJECT: Social Studies
Science
Mathematics

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

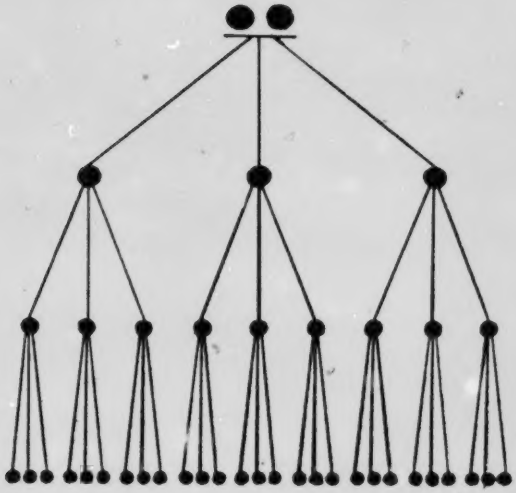
REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

ACTIVITY: The following activity begins to explain the difference in future population growth resulting from an average family size of two children and one of three children. A skein of brightly colored yarn is needed for this activity. The chairs in the room should be pushed against the walls so that a large, open space is available. The activity works best in large groups (50 or more), although it can be used in smaller classes as well.

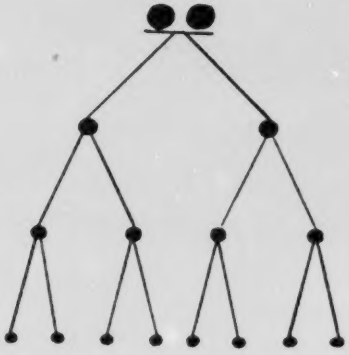
Two students are selected to be a "mother and father". This couple is given three pieces of yarn to indicate that they will have three children. They select three students in the group to represent their own family of three children. Each of these persons is then given three pieces of yarn and selects three students to represent his or her children. Again the new "parent" is connected to the children with yarn (see diagram below). The process continues until all of the students are selected.

After doing the exercise, the students should diagram the activity. They may want to carry the diagram farther on paper than was possible in class (e.g., four, five, or six generations). The teacher might ask: "How many people have been born into this world after two generations? After three? Four? Six? Ten?"

After a brief discussion, the yarn activity should be repeated with one modification. The couples should decide to have two children. Then a second chart should be drawn. Students should spend the rest of the period analyzing the data in the charts and making comparisons between them. Various hypotheses and generalizations can be drawn from the data (i.e., if the number of children per family is reduced to two, instead of three, then the number of years it takes for the population to double should increase).



3 people—1 generation
9 people—2 generations
27 people—3 generations
39 people total



2 people—1 generation
4 people—2 generations
8 people—3 generations
16 people total

IMPORTANT NOTE: The preceding activity oversimplifies reality. In group discussion, be sure to account for the following:

1. There will always be a range of family size in society. Some people won't marry. Some couples will choose to have no children, while others may have one, two, three, or more children.

2. For the sake of simple example, the activity only follows one family line. Note, however, that the rate of growth indicated in both the 2-child and 3-child exercises is overstated because offspring are shown in proportion to one parent only.

3. Deaths are not figured into this exercise. Students are learning about the number of people born into a hypothetical world, not the number of people existing in it.

4. The length of generations varies. To illustrate this, the length of yarn pieces may be varied.

PURPOSE: To generate discussion concerning perceptions of the term "crowded".

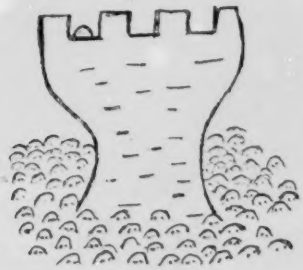
LEVEL: Elementary-junior high school

SUBJECT: Social Studies
Science
Art

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 39.

ACTIVITY: If you live in a small community, put this drawing on the board and discuss and compare it with people's attitude in your town.



"What Population Explosion?"

PURPOSE: To illustrate difference between distribution of world food resources.

LEVEL: Elementary-junior high school

SUBJECT: Social Studies

CONCEPT: Political instability seems probable as long as a few nations consume a disproportionate share of the earth's finite supply of resources, including food.

ACTIVITY: Global Geography

Push the desks to the sides and back of the room to provide the largest possible open space. Use tape or chalk to mark off large rectangles to represent the continent or subcontinents of Africa, Asia, Europe, Latin America, and North America according to proportions of the earth's land mass. Give students an identity card so that they become a resident of one continent. The continents have respectively 10%, 59%, 17%, 8% and 6% of the world's population. Divide the class and apportion appropriate numbers of students to each area. Once in the continents, students must restrict their occupation of space to the amount of land actually fit for human habitation. (EXAMPLE: In Asia, one-sixth of land mass.)

Next, an ambassador, who is elected or appointed by residents, reads a brief description of the continent prepared in advance by teacher or students. It should include population size, land mass, economic base, role of women, etc. After each ambassador reads the description of the subcontinent, he/she distributes a portion of a long loaf of French bread representing that continent's daily share of world protein (1/3 to Europe, and divide remaining 2/3 as 1 part to Latin America, 2 to North America, 2 to Asia, and 3/4 of one to Africa. The small piece left over goes to Europe).

Discuss the feelings students have after participating in the activity.

Note: Full version of game "Food for Thought" ($3.00) may be ordered from:

Population Institute
110 Maryland Ave., N.E.
Washington, DC 20002

or

Population Reference Bureau
1337 Connecticut Ave., N.W.
Washington, DC 20036

PURPOSE: To facilitate an understanding of human population growth.

LEVEL: Elementary - junior high school

SUBJECT: Mathematics
Science,
Social Studies

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

ACTIVITY: Indicate to the class data such as those presented below from a recent United Nations research study. World wide births of 240 persons per minute are significantly larger than the 96 deaths in the same time.

Engage the class in visualizing what this means in some small time frame such as 10 minutes.

Bring the class at least 4,000 kernels of popped corn in two plastic bags: approximately 2,800 in one and 1,200 in the other. Set out two large clear containers of equal size, one labeled world births, the other world deaths. Organize the class so that each minute (for a total of 10) a different student places 240 kernels in the "birth container" to represent world births during that time. Simultaneously, 10 students will be placing 96 kernels each minute into the other container to represent deaths.

How do they compare? What actual difference per minute exists between world births and deaths? If arithmetic skill level permits calculate growth per hour, day, week, and year.

Identify and discuss some of the factors influencing birth and death ratios in various countries.

World Population Growth - 1973*

Net increase per second		4.0 babies born each second 1.6 humans die each second 2.4 people are added each second to the present world population
Per minute	144	
Per day	207,000	
Per week	1,451,000	
Per year	75,000,000	

*United Nations Population and Vital Statistics Series A. Vol. 25 #2, 1973.

Here are some examples of population sizes and growth rates for developed and less developed countries in 1973:**

	Population in Millions	Rates per 1,000 Population			Annual Rate of Growth
		Births	Deaths	Immigration	
Mexico (LDC)	56	43	10	-	3.3%
W. Germany (DC)	59	11.5	11.7	0.2	0.0%
Brazil (LDC)	101	38	10	-	2.8%
United States (DC)	210	15.6	9.4	1.9	0.8%
U.S.S.R. (DC)	250	17.8	8.2	0.4	1.0%
India (LDC)	600	42	17	-	2.5%
China (LDC)	799	30	13	-	1.7%
World	3,860	33	13	-	2.0%

**1973 World Population Data Sheet: Population Reference Bureau, Inc., Washington, D.C.

PURPOSE: To illustrate basic demographic phenomena.

LEVEL: Elementary-junior high school

SUBJECT: Mathematics
Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena

ACTIVITY: Present to the class the following "riddle worksheet" developed by Byron C. Massialas.

The population of the U.S. changes every minute. Approximately every 10 seconds a new person is born. Every 15 seconds a person dies. Every 90 seconds an immigrant enters the U.S. Every 15 minutes an emigrant leaves the country. Assume the population of the U.S. was 215,000,000 people at 9:00 this morning. How many people will there be in the U.S. at 9:15 this morning?

1. How many people will be born in 15 minutes? _____

2. How many people will die in 15 minutes? _____

3. How many immigrants will enter the U.S. in 15 minutes?

_____

4. How many emigrants will leave the U.S. in 15 minutes?

_____

5. What is the population growth in a 15-minute period? Remember that population growth is calculated this way:

births - deaths + immigrants - emigrants = population growth

_____ _____ _____ _____ _____

6. What is the total population of the U.S. at 9:15 a.m.?

215,000,000 people + population growth = new total

_____ people + _____ = _____

From: Resource Material Development: Population Dynamics in Eighth Grade American History, "Episode VIII, Comparing Population Changes in Societies", Byron C. Massialas, Director, Florida State University, Tallahassee, FL, 1974.

7. How many people will be added to the population:

at 9:30 a.m.? _____

at 10:00 a.m.? _____

in 24 hours? _____

PURPOSE: To illustrate through the arts the relationship of population growth to environmental problems.

LEVEL: Elementary-junior high school

SUBJECT: Art

CONCEPT: Population changes in the United States and other nations affect the individual and society.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973. (Activity suggested by Janet Parsons.)

ACTIVITY: If you teach art you might have students express in artistic form how population is related to some aspect of the environment. They might create a cartoon describing some aspect of over-population or draw their impressions of the kind of world they want. They might create a collage in the form of a transparency from photographs relating to population cut from magazines and newspapers. Peel the backing off Mac-Tac or other transparent contact paper and lay it adhesive side up on the work area. Arrange the pictures face down on the Mac-Tac, rub them with a large spoon to remove air bubbles, and soak the whole piece in warm water for 5 to 6 minutes. Peel off the pictures and the transparency-collage is left.

PURPOSE: To demonstrate the concept of "limits to growth".

LEVEL: Elementary-junior high school

SUBJECT: Social Studies

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, pp. 34-35.

ACTIVITY: Using your classroom as an example of a nation with limited resources you can develop a number of population and resource-use concepts: How many seats in your classroom? (space) How many students?

Make an inventory of the material resources in your classroom--the textbooks, art supplies, science equipment, paper, etc. If one student moves away from your class and another one moves in, what is the net effect upon surplus classroom resources? (Balance between birth and death rate.) If you do not have such a situation, set up and equip a desk with all the items an added student would need. You can even go so far as to put paper on this desk every time it is handed out to the rest of the class so that the students can see it accumulate and gain an appreciation of the amount of material they consume in a given period of time.

If your stock of some classroom resource has been completely depleted, what alternatives are open to the class?

Books and locker space can be shared (lowered standard of living).

The item can be borrowed from some other class that has an excess (friendly cooperation, commerce, etc.).

You can attempt to appropriate the item from another class without their consent (political aggression) or persuade a student in another class to give you his book and you will pay his fine for "losing" it (economic aggression, since to better himself that student cannot really afford to lose the valuable resource of the book).

What services are offered in the classroom community? Assume that the teacher's personal attention is the major service. If the teacher gives five minutes individual attention a day

to each student, how does this affect the amount of time left for group instruction if one or two new members are added to the class? If time allotted for class instruction is kept fixed, what happens to the amount of time the teacher can spend in individual attention (population increases force decisions on the relative values of various services)?

Follow up this whole analogy with a discussion of the underlying principles that the students have dealt with and show how they apply to population and resources in general.

PURPOSE: To develop an understanding of population concepts through a class developed research project.

LEVEL: Elementary-junior high school

SUBJECT: Social Studies
Science
Home Economics

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 46.

ACTIVITY: Work with students in drawing up a questionnaire on population problems. Have students interview parents and other community members and share the results with the class.

Have students write down what they consider the ideal family size. Tabulate the results and discuss reasons for size selections.

PURPOSE: To examine changing mortality rates.

LEVEL: Elementary-junior high school

SUBJECT: Science
Social Studies

CONCEPT: The population explosion is largely due to reduction in the death rate.

REFERENCE: "Equilibrium", January 1974. Zero Population Growth, 1346 Connecticut Ave., NW, Washington, D.C. 20036

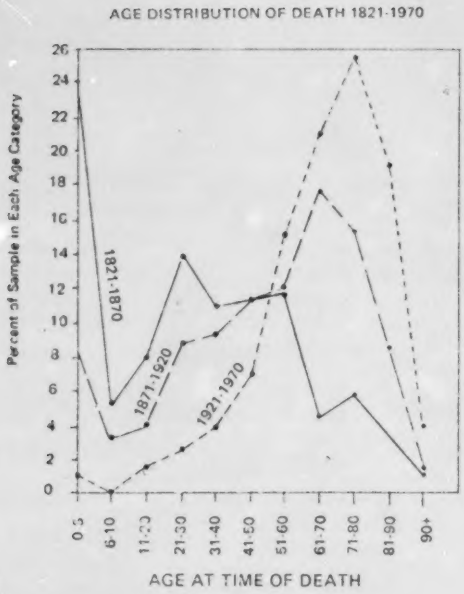
ACTIVITY: During a study of the history of the community or the State or during a study of changing health care during the last 100 years or so plan to have a class take a "cemetery field trip". An old but still used cemetery is ideal for this study.

Divide the class into groups of two and plan to collect "age at time of death" data from as many randomly selected tombstones as possible. Try to collect as much data as time permits and try to sample the entire cemetery area.

Ask each team to collect data in an open table such as that shown below. Summarize data collected by each team into a total class result. Calculate percentages of deaths during various age spans during different time periods. Ask each student to plot the results on a graph similar to that shown below. Finally engage the class in discussing how the pattern of age at time of death has changed over the years. Why? Which age group has benefited most? What has been responsible for this? What factors shown in the data and/or graph lead to greater population size?

Death Rates Within Specified Age Categories (1821-1970)

Time Periods												Totals
1821 to 1870	212	49	78	136	103	109	110	43	53	35	9	933
	23%	5%	8%	15%	11%	12%	12%	5%	6%	4%	1%	
1871 to 1920	216	63	107	220	290	306	313	350	411	223	34	2611
	8%	2%	4%	9%	10%	12%	12%	13%	16%	9%	1%	
1921 to 1970	29	8	48	76	107	202	385	591	725	534	117	2822
	1%	0%	2%	3%	4%	7%	14%	21%	26%	19%	4%	
Age at Death	0 to 5	6 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90	Over 90	6366


AGE DISTRIBUTION OF DEATH 1821-1970
Percent of Sample in Each Age Category
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1821-1870
1871-1920
1921-1970
0-5
6-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
90+
AGE AT TIME OF DEATH

PURPOSE: To clarify values associated with parental roles.

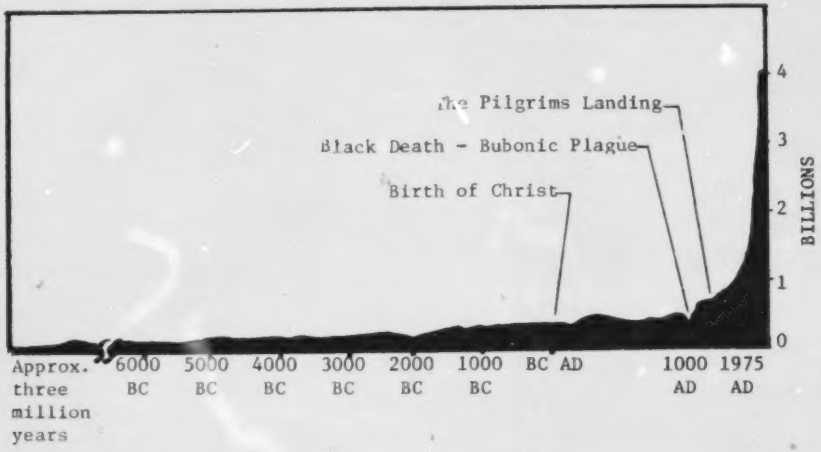
LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to attitudes toward marriage and child-bearing.

ACTIVITY: After providing a background discussion of the population dilemma, launch into discussion about the first two human beings on the planet. Ask students to suggest reasons these individuals had for pairing and child-bearing. Illustrate by graph the growth of the human population to the present level (4 billion, 1976). Then ask the students if there has been any change in reasons for pairing and child-bearing. Ask them to share their own intentions and to support them with reason.

POPULATION THROUGH HISTORY



(To continue back to the beginning of man, approximately 3 million years ago, using this scale, the base line would have to be extended 140 feet to the left.)

Year	Population Size	Doubling Time (Yrs.)	Annual Growth Rate
3 million B.C.	415,000	–	–
400,000 B.C.	1 million	About 2.5 million	0.00003%
20,000 B.C.	2.2 million	About 400,000	0.0002%
6,000 B.C.	5 million	About 14,000	0.005%
1650 A.D.	500 million	–	0.3%
*1850 A.D.	1,000 million	200	0.5%
1830 A.D.	2,000 million	80	0.8%
1974 A.D.	3,860 million	45	2.0%

(Source: Population Reference Bureau Bulletin: 18: February, 1962.)

*Typographical error in source document. The dates 1830 and 1850 should be reversed.

PURPOSE: To give students a feeling for the actual growth in world population since 1500.

LEVEL: Elementary-junior-senior high school

SUBJECT: Mathematics
Social Studies
Science

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 39.

ACTIVITY: First, mark off a circle about 6 feet in diameter. Start with three students in the circle to represent the world's population in 1500, and have students enter the circle according to the table. One student represents approximately 150 million people, and one second represents one year.

Year	World Population	Interval	Add Students at End of This Simulation Interval	Add to Circle	Total Students in Circle
1500	500 million		Beginning of simulation	3 students	3
		250 years	4 minutes, 10 seconds	2 students	5
1750	750 million				
		100 years	1 minute, 40 seconds	2 students	7
1850	1,000 million				
		50 years	50 seconds	3 students	10
1900	1,500 million				
		25 years	25 seconds	3 students	13
1925	2,000 million				
		24 years	24 seconds	4 students	17
1949	2,500 million				
		23 years	23 seconds	3 students	20
1962	3,000 million				
		10 years	10 seconds	5 students	25
1972	3,800 million		End of simulation		

PURPOSE: To illustrate some of the impacts of current rate of population growth.

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Science
Home Economics

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 38. (Activity suggested by Louise Martin.)

ACTIVITY: Involve a student or small group in printing quotations such as the following on tag board to be placed around the classroom. Engage the class in discussion of the implications of some of the quotations.

> To house the expected increase in population in the United States by the year 2000 it will be necessary to build a new city of about 200,000 each month from now until 2000.
>
> About one-half the population in under-developed countries is under 15 years of age.
>
> The brain grows to 80% of its adult size in the first three years of a child's life. If proteins are not available to the child at this time, the brain stops growing. This lack can never be remedied.
>
> Every 10 seconds an American is born. He or she will live about 70 years. He or she will use 56,000,000 gallons of water, 21,000 gallons of gasoline, 10,150 pounds of meat, 28,000 pounds of milk and cream, 9,000 pounds of wheat. Did you realize how much of the earth's resources each person uses?
>
> If a family has 11 children and each of their children has 11 children, and if their descendents continue to have 11 children, there will be 250 billion people after just ten generations--that's sixty times the population of the earth today.

PURPOSE: To illustrate how populations grow with respect to "carrying capacity".

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Science
Mathematics
Home Economics

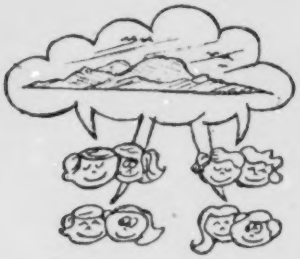
CONCEPT: Carrying capacity caused by the interaction of population growth, resources, and technology is reached and often exceeded whenever pollution is indicated.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 49.

ACTIVITY: Present to students the following problem found in the reference cited above.

Sometimes by taking a very small slice of life you can better understand the relationship between people, food and land. See if you can figure out this problem:

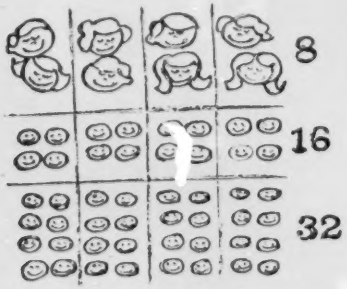
> Let's say that four married couples heard about an island that was like a paradise. It had a warm climate, fertile soil, clean air and pure water.



> These four couples want to live a simple life. The things they value are to be self-sufficient, to breathe fresh air, live in uncrowded homes, enjoy the natural beauty of their land; to avoid wars and have as many children as they want. So they decide to move to this island and start a new life. They bring along various seeds to get started farming and food enough to last until their crops are ready.

There is enough farm area and living space on this island to support 100 people. This gives the couples plenty of elbow room.

Let's say the couples start having families at age 20 and each couple has four children. An equal number of girls and boys. This would increase the population by 16.



These children marry and start having their own children at age 20 and again each couple has four children. This would increase the population by 32. Their children marry and again each couple has four children.

Can you figure out how long it would take before there were over 100 people on the island and what would happen after there were 100 people? Try and decide how you would regulate human life on the island--or keep it down to the limits the island could support. And finally, if you can, you might see if your ideas would work for real life on earth, the island in space that's getting crowded.

PURPOSE: To relate population growth to students' everyday living experiences.

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Language Arts
Home Economics

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

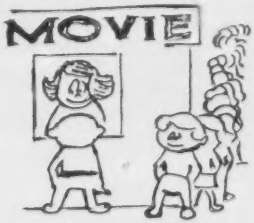
REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 43. (Activity suggested by Marilyn Stuart.)

ACTIVITY: Relate population growth to the students' own lives by discussing these questions.

Can you think of a personal experience of your own where you had the feeling of overpopulation?

Can you think of any inconveniences to yourself personally if there were twice as many people in the area where you live? (Students might come up with such things as no private swimming pools because they use too much fresh water, no open fires on beaches or in fireplaces because of air pollution.)

Are there any problems in your area that have resulted from overpopulation already?



To enhance some of these discussions, older students might read the prize-winning play written by a Portsmouth, R.I. high school student, "Taking Honor," in the May 17, 1971 issue of "Scholastic Scope" Magazine. There are twelve speaking parts.

The play concerns a family that has violated the law by having a third child, Honor. The play centers around the family barricaded up in their home to protect themselves against their friends and neighbors who have come to try to take the child.

Another reading that provokes a lot of discussion is the story "Billenium" found in the anthology Voyages; Scenarios for a Ship called Earth, a collection of science fiction short stories published by Ballantine Books, 1971.

The story concerns a man in the future who has only a tiny individual cubicle to live in. The government orders that the cubicles be made even smaller to accommodate the ever-growing population. The government has made no provision or encouragement for birth control. In fact, it encourages a high birth rate to provide enough workers for its ever-growing industrial workers' complex. The trials of the main character to escape the fate of an ever-decreasing cubicle and to find a "room of his own" provide the plot.

PURPOSE: To develop an understanding of demographic data and implications of these data in a diversity of nations.

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for The Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 46. (Activity suggested by Michael Walker.)

ACTIVITY: An excellent research project involves suggesting each student choose an individual country and find out about the population growth rate and the average family size. When the students have completed their research, have the class discuss which countries traditionally have high population growth rates and why. Does it affect their quality of living? Do they have food shortage problems?

Which countries have low population growth rates? What are the reasons for this? What quality of living do they have? Do they produce enough food for all their people?

PURPOSE: To demonstrate "replacement level".

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Science
Mathematics

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

ACTIVITY: Use an overhead projector to illustrate the following information to your students:

MILITARY "BATTLE DEATHS" IN U.S. WARS*

Revolutionary War	6,824
War of 1812	2,260
Mexican War	1,733
Civil War:	
Union	140,414
Confederate	74,524
Spanish-American War	385
World War I	53,513
World War II	292,131
Korean War	33,629
Vietnam War	46,496
	651,909

U.S. POPULATION INCREASE, 1974

Natural Increase (births minus deaths)	1,205,139
**Legal Immigrants	394,861
Total Increase (1974)	1,600,000

1. How long would it take the U.S. to replace the battle deaths of all its wars?
(Answer: At our present rate of growth it would take the United States less than one-half year to replace all the lives lost in all wars we have ever fought.)

2. How long would it take the world to replace this number of battle deaths?
(Answer: The WORLD population increase each day is about 207,360. At this rate, the loss by military deaths in all U.S. wars could be replaced in about 3 days.)

*Data Source: The World Almanac, 1977.
**Illegal immigrants are estimated to be more than 650,000 annually.

PURPOSE: To illustrate exponential growth and doubling time.

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Mathematics
Science

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

REFERENCE: Reprinted from OPTIONS with permission of The Population Reference Bureau.

ACTIVITY: Doubling Lily Pads

The riddle below serves as a springboard for discussing the doubling of the population. Students should be given the riddle and a few minutes to figure it out. Each student should be encouraged to arrive at his or her own answer before comparisons are made. If the class is slow, the teacher might want to have the students work in groups of two or three to solve the riddle.

> Suppose you own a pond on which a water lily is growing. The lily plant doubles in size every day. If the lily were allowed to grow unchecked it would completely cover the pond in 30 days, choking off the other forms of life in the water. For a long time the lily plant seems small, and so you decide not to worry about cutting it back until it covers half the pond. On what day will that be?
>
> --Donella H. Meadows, et. al.
> THE LIMITS TO GROWTH
> (New York: Universe Books, 1972), p. 29.

At first, some students may guess that the pond will be covered on the thirteenth day, others on the twenty-ninth day. It may be surprising to the students to find out that the pond will be only half-covered on the twenty-ninth day, and completely covered one day later. The students should discuss why everyone did (or did not) agree that the lily pad would cover half the pond on the 29th day.

Utilizing the lily pad activity as an example, launch into discussion of the doubling time for human populations using the following formulae:

The birth rate measures the number of babies born in one year for each 1,000 persons in the population at the midpoint of that same year:

$$\text{BIRTH RATE} = \frac{\text{NUMBER OF BIRTHS PER YEAR}}{\text{POPULATION}} \times 1{,}000$$

Similarly, the death rate is the number of deaths in one year per 1,000 population:

$$\text{DEATH RATE} = \frac{\text{NUMBER OF DEATHS PER YEAR}}{\text{POPULATION}} \times 1{,}000$$

Net migration is the difference between the number of people who enter the country in one year (immigration) and the number who leave (emigration):

$$\text{NET MIGRATION} = \text{IMMIGRATION} - \text{EMIGRATION}$$

Net migration can be converted to a "per-1,000" figure and added into the equation to yield the growth rate:

$$\text{GROWTH RATE} = \frac{\text{BIRTH RATE} - \text{DEATH RATE} + \frac{\text{NET MIGRATION}}{\text{POPULATION}} \times 1{,}000}{10}$$

Doubling time is the number of years needed to double the original population size, depending on a country's rate of population growth, e.g.:

GROWTH RATE	DOUBLING TIME
1%	70 years
2%	35 years
3%	23 years

PURPOSE: To clarify values associated with life style options.

LEVEL: Elementary-junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to numbers and types of roles available to men and women.

ACTIVITY: The following letter appeared in the syndicated column, "Dear Abby":

> Dear Abby: My husband and I have been married for nearly twelve years. We are childless and whenever we are asked if we have children and we say we haven't, someone always says, "Oh, isn't that too bad".
>
> We then say, "Not really. We never wanted any." Then they look at us like we are monsters.
>
> We feel that our lives are full and very rewarding without children. We are able to travel, do a great deal of civic, political, and humanitarian work we couldn't do if we were raising a family. And we are happy! We don't hate children. We like them. But we feel the world doesn't need any more.
>
> Please tell your readers that there are some perfectly sane people who do not want to be parents. I am tired of having strangers pity us when they learn we have no children.

Following a background discussion in the population problem, utilize this article to launch your class into discussion concerning life style options, and sex role stereotypes, in order to clarify values. Ask how many agree or disagree, and why. Relate to the population problem.

PURPOSE: To examine population density differences within the United States.

LEVEL: Junior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

ACTIVITY: At an appropriate time during a study of problems related to population pressures ask students individually to write down the names of the five states they "guess" have the highest densities of population per square mile; also the five states with the lowest densities. After recording their choices on the chalkboard and searching for consensus present the data shown below obtained from the 1970 census.

What factors do the states with highest densities have in common? What factors are common for low density states?

Persons driving through the open countryside sometimes observe that the U.S.A. certainly does not appear to be overpopulated. This would certainly be true for the five states with low density populations. If some states such as New Jersey are getting too congested why not relieve the pressure by inducing them to move to Wyoming? What determines the size of a population that can live in a given state?

State	Population per Square Mile*
Alaska	0.5
Wyoming	3.4
Montana	4.8
New Mexico	8.4
South Dakota	8.8
New Jersey	953
Rhode Island	905
Massachusetts	727
Connecticut	624
Maryland	396

*1970 Census Data

PURPOSE: To illustrate the geometric nature of population growth.

LEVEL: Junior high school

SUBJECT: Mathematics

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

ACTIVITY: Divide the class into six groups. Ask each group to first guess and then to calculate how many great-great grandchildren (5 generations later) they will have if they and their descendents have family size as follows:

Group	Number of children to each marriage through five generations
1	2
2	3
3	4
4	5
5	6
6	7

How accurate were their guesses?

What problems, if any, became apparent?

PURPOSE: To help students understand the size of "a million".

LEVEL: Junior high school

SUBJECT: Mathematics

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth, as a finite system, cannot accommodate these increases indefinitely.

ACTIVITY: If possible bring into the classroom a stack of one dollar bills such as used by bank tellers. If this is not feasible bring into class a measuring device such as a micrometer to measure the thickness of a single dollar bill. Using the stack of bills or the measurement obtained from a single bill involve the students in calculating the number of dollar bills needed to make a pile one inch high (about 100).

Remind the students that we use the term million often but we may have little understanding of how many a million really is. Using the number of dollars that comprise one inch of thickness ask the students to calculate the height of a stack of dollar bills that would contain one million.

Indicate to the class that the population of the U.S.A. is growing approximately two million per year. What height of dollar bills would represent that growth? Indicate, finally, that the world is gaining approximately 75 million people per year. What height (or length) of dollar bills would represent that growth?

Are students concerned with this amount of growth? Why or why not?

PURPOSE: To examine how birth rates differ among countries.

LEVEL: Junior high school

SUBJECT: Mathematics
Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts. Pat King and John Landahl, Washington State Department of Education, Olympia, Washington 98504.

ACTIVITY: Review with the class the idea of compounded rate of growth. Thus $100 invested at 1% and compounded annually will not take 100 years to grow to $200, but will actually double in 70 years. The same principle applies to human population growth; thus the approximate time required for a human population to double can be calculated by dividing 70 years by the population growth rate in percent.

Present to the class growth rate data such as that cited below. Ask students to calculate doubling times for each country. What differences are noted? What portions of the world deviate most from the world average? Why? Are the data frightening or reassuring? Why?

Region or Country	Population Growth Rate (%)
United States	1.0
World	2.0
Costa Rica	3.8
North America	1.1
Latin America	2.8
Europe	0.7
USSR	0.9
Asia	2.3
Africa	2.6

PURPOSE: To examine factors responsible for lowering infant mortality rates.

LEVEL: Junior high school

SUBJECT: Science
Social Studies

CONCEPT: The population explosion is largely due to reduction in the death rate.

REFERENCE: People! An Introduction to the Study of Population. Population Reference Bureau, 1973. Columbia Books, publishers, 734 15th St., N.W., Washington, D.C. 20005.

ACTIVITY: Review with the class the influence of disease and famine on the first colonial settlements in America. Out of the first group of 102 Pilgrims who cane to Plymouth, 38 died in the first six months. Thirty-nine out of 108 who settled at Jamestown died within 180 days. Babies and children had a particularly difficult time. Often more than one-fourth of the babies born died before their first birthday. More than half of the children born died before adulthood. Today with modern medicine and other factors operating 96 out of 100 babies born in the United States live to become adults.

Population growth in colonial times and until fairly recently was affected greatly by the following diseases: typhoid fever, yellow fever, cholera, smallpox, diptheria, and malaria. Ask each student to interview, if possible, one of the oldest persons in his neighborhood (a grandparent or great-grandparent would be ideal) to find out what they remember about the attitudes toward such diseases and the fact that many children died very young. Ask students, also, to do library research on one of the diseases to ascertain its cause and how it has been controlled.

Develop conclusions in a class discussion with students reporting their interview and library findings. Discuss the relationship, if any, of improved infant survival rates with smaller family size.

PURPOSE: To examine changing health problems in the world's population.

LEVEL: Junior high school

SUBJECT: Science

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to health.

REFERENCE: Environment and Population. A Manual of Learning Activities for Elementary Grades. Susan Pruett and Carol Harrington, P.O. Box 602, Rochester, Michigan 48063.

ACTIVITY: Indicate to the class, without going into detail, that diseases such as black plague, smallpox, malaria, and typhoid fever were very prevalent during the Middle Ages and until fairly recent times. Indicate, also, that marasmus, kwashiorkor, beriberi, and rickets are major health problems in the world today.

Assign two or three students to research in an unabridged dictionary and/or encyclopedia each of the diseases named above. What causes the disease? How prevalent was (is) it? How can it be prevented? Does it affect children and adults equally? Is it more likely to be found in rich or poor countries? Why?

Ask students to report their findings to the class. Attempt to generalize the relationship between deficiency diseases and overpopulation. Draw the distinction between infectious and deficiency diseases.

PURPOSE: To examine conditions that affect population movement.

LEVEL: Junior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to changes in immigration.

ACTIVITY: Review with the class data such as that cited below from the World Almanac that shows the extent to which population growth in the United States during the past 100 years was due to immigration from other countries.

Ask each student, as homework, to interview his mother or father to ascertain when and why his ancestors left their birthplace (2, 3, 4 or more generations ago) and came to America. The following day ask each student to report what was learned from a parent and organize the data into a matrix on the chalkboard. How is the data similar to or different from that cited below?

What were the most common reasons for coming to the United States? Are those reasons still present in this country? Why or why not? Is immigration likely to increase or decrease in the years ahead? Why?

Years	Number of Immigrants Admitted to The United States
1851-1860	2,600,000*
1861-1870	2,300,000
1871-1880	2,800,000
1881-1890	5,200,000
1891-1900	3,700,000
1901-1910	8,800,000
1911-1920	5,700,000
1921-1930	4,100,000
1931-1940	500,000
1941-1950	1,000,000
1951-1960	2,500,000
1961-1970	3,300,000

*Rounded to nearest hundred thousand

PURPOSE: To examine historical population growth in the United States.

LEVEL: Junior high school

SUBJECT: Mathematics
Social Studies

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

ACTIVITY: Present to the class data listed below that show the tremendous growth of population in the United States from the first census in 1790 to the latest major census in 1970. Ask that each student graph the data to examine rate of growth during that 180 year period of our history.

Engage the class in a review discussion of factors that were responsible for the fast early growth of our country, e.g. cheap land, large families, large immigration, etc. Since these factors are no longer operating as strongly as they did in earlier times ask the class to explain why our numerical growth has not slowed perceptibly (a much larger number of families are now having children even though the average family size has decreased).

Finally discuss, as time and interest permit, the question of optimum population level for the United States. Speculate as to whether it might be in the past, present, or future.

Population Growth in United States*

Year	Population
1790	3,900,000**
1820	9,600,000
1850	23,200,000
1880	50,200,000
1910	92,000,000
1940	131,700,000
1970	203,200,000

*Data from 1974 The World Almanac

** Rounded to nearest 100,000

PURPOSE: To examine attitudes toward big cities.

LEVEL: Junior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

ACTIVITY: The United States contains at least 35 metropolitan areas with a population of one million or more. The three largest are New York City area (10 million), Los Angeles area (7 million), Chicago area (7 million). Many persons have expressed concern about problems such as high crime rates, transportation, pollution, waste, water supply, garbage and waste disposal and others that seem, inevitably, to get bigger as cities grow in area and population.

Ask each student to interview, as homework, two adults (parents are permissible) with questions such as the following:

1. Do they regard big cities as good places in which to live?

2. Do they see big cities as a threat to the "American way of life"?

3. What, if anything, should be done to curtail growth of cities?

4. Do they believe the big cities may be the result of "too many people"?

Pool results obtained by class members and attempt to find agreement, if any, expressed by the adults interviewed. Ask each student to answer the same questions and search for agreement, if any, that exists among students. If adults and students disagree try to account for the differences.

PURPOSE: To investigate the effect of population increase on use of water in an urban community

LEVEL: Junior high school

SUBJECT: Social Studies

CONCEPT: Carrying capacity caused by the interaction of population growth resources and technology is reached and often exceeded whenever pollution is indicated.

ACTIVITY: Review with the class the critical importance of water in the community. Ask students to explain the importance of water in the home, in sewage disposal, in industry, for recreation.

As population increases adequate water supplies may become difficult to obtain without proper long-range planning. Ask for several student volunteers to interview by telephone or in person some individuals who are particularly concerned with this matter (e.g. Chamber of Commerce spokesmen, city water and sewage personnel, boat owners, fishermen, industialists, and voters.)

Ask the students to report the results of their interviews to the class. Does the city have a foreseeable "water problem"? What can be done about it? What is being done to forestall the problem? To what extent is the problem related to growth in population or to growth in water usage? Should growth in city size be limited (somehow) to minimize problems such as securing adequate water supply?

PURPOSE: To examine student attitudes toward population issues.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to attitudes toward marriage and child-bearing.

ACTIVITY: An "opinion poll on population" such as that shown below can be used as a simple pretest and posttest to determine what attitude changes, if any, occur during a unit study on population or on an issue related to population growth such as food, energy, or land use. Students should be informed prior to answering the questions that there are no absolutely "right" answers.

After students have responded individually and anonymously to the questionnaire it might be interesting to have the girls in the class analyze the responses of the boys and vice-versa. Ask one or two girls to react to the boys' responses in terms of "surprises", agreements, disagreements and so forth. Boys, of course, should be given the same opportunity for girl responses.

OPINION POLL ON POPULATION

Check one:
Boy ____ Girl ____

1. Do you think the United States is overpopulated?
   Yes ____ No ____

2. Do you think the WORLD is overpopulated?
   Yes ____ No ____

3. Do you think U.S. population should continue to grow?
   Yes ____ No ____

4. Do you think the U.S. population has stopped growing?
   Yes ____ No ____

5. Do you think people should limit the size of their families to two children?
   Yes ____ No ____

6. What do you think is the ideal family size?
   1 child ____ 2 children ____ 3 children ____
   more than 3 children ____

7. Do you think there's something strange about a woman who says she doesn't want to get married and have children?
   Yes ____ No ____

8. Do you think there's something strange about a man who doesn't want to get married and have a family?
   Yes ____ No ____

9. Should a woman have the right to decide whether she wants to bear a child?
   Yes ____ No ____

10. Do you think our country should help other countries if they won't limit or try to control their population growth?
    Yes ____ No ____

11. Do you think population growth is a threat to the survival of the human race?
    Yes ____ No ____

12. Should schools provide information on population issues?
    Yes ____ No ____

PURPOSE: To illustrate various perceptions of crowding

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

ACTIVITY: Suggest to your students that they have a choice between two-week, all-expense-paid vacations.

Choice 1: A log cabin in a remote but pristine area in the northern woods of Maine.

Choice 2: A popular ski area with 20,000 on the slopes each weekend, and a lot of action in the ski lodge at night.

Take a numerical poll as to how many students prefer each. Now ask who would prefer to live permanently in a situation like #1 or in a large city. The number of preferences will now probably shift. Discuss why this shift has occurred. Be sure to point out that people have different perceptions about what is "crowded", and these may change from time to time based upon extraneous factors.

PURPOSE: To examine responsibilities associated with parenthood.

LEVEL: Junior-senior high school

SUBJECT: Home Economics
Social Studies
Science

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to attitudes toward marriage and child-bearing.

ACTIVITY: Review with the class the simple dictionary definition that a mother is "a woman who has given birth to a child". Beyond this simple biological fact is the responsibility of being a "parent". A spokesman for the Sierra Club has observed that "parenthood is the most important occupation for which we have no specialized training.".

Divide the class into groups of three or four students. Ask each group to discuss and subsequently list during a 20-30 minute group work assignment the qualities and/or conditions that are necessary to be a "good" parent. Beyond maternal and paternal love the groups may list such factors as ability to provide adequate food, clothing, shelter, medical care, educational toys, patience, willingness to curtail personal activities, and so forth.

Ask each group to share their list with the entire class and develop from the group reports a master list on the chalkboard.

With the master list on the chalkboard as a guide to use for personal reflection ask students to write a short paper in which they judge when they believe they will be qualified to take on the role of "good parent".

Ask students also to comment on the qualifications of most teen-agers, as they know them, to assume the responsibilities of parenthood.

If they believe many or most teen-agers are not qualified for this responsibility what can be done about it?

PURPOSE: To examine the concept of "doubling time".

LEVEL: Junior-senior high school

SUBJECT: Mathematics
Science
Social Studies

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

ACTIVITY: Present to the class a worksheet that contains thirty-one spaces representing the days in one month. Share with the class the following classic riddle:

> "A father complained that his son's allowance of $5 per week was too much. The son replied, "Okay, Dad. How about this? You give me a penny for the first day of the month, 2¢ for the next, 4¢ for the next, 8¢ for the next, and so on for every day of the month." The father, thinking he had a foolish son, readily consented.
>
> Which, indeed, was the more clever?"

Ask that students complete the calculations on how much "allowance" the son would get on each day of the month. How much total for the month?

After students understand the concept of "doubling time" indicate that the population of the world is doubling every 35 years. Also indicate that the world's present population is about four billion persons. Thirty-one doublings (every 35 years) would require 1085 years--a much shorter time than from the birth of Christ to the present.

If the present population of four billion doubles every 35 years how many persons would live on the world 1085 years in the future? Why is this clearly impossible? What will prevent it? Is this a condition man can/should do something about or must it be left to "natural" solutions?

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

The Son's Allowance

Day 1	$ .01	Day 17	655.36
Day 2	.02	Day 18	1,310.72
Day 3	.04	Day 19	2,621.44
Day 4	.08	Day 20	5,242.88
Day 5	.16	Day 21	10,485.76
Day 6	.32	Day 22	20,971.52
Day 7	.64	Day 23	41,943.04
Day 8	1.28	Day 24	83,886.08
Day 9	2.56	Day 25	167,772.16
Day 10	5.12	Day 26	335,544.32
Day 11	10.24	Day 27	671,088.64
Day 12	20.48	Day 28	1,342,177.28
Day 13	40.96	Day 29	2,684,354.56
Day 14	81.92	Day 30	5,368,709.12
Day 15	163.84	Day 31	10,737,418.24
Day 16	327.68	Total	$ 21,474,836.47

PURPOSE: To examine the relationships between family size and family budgets.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Struggles of many families and nations to develop economically are prolonged and made more difficult by rapid population growth.

ACTIVITY: Present to the class a "typical" family budget for a family of four with an income of $10,000 per year. Indicate, with aid of a large circle graph, typical amounts spent per year by such a family for food, shelter, clothing, transportation, recreation, insurance, and miscellaneous expenses.

Divide the class into five groups that represent family sizes as follows: two persons (no children), three persons (one child), five persons (three children), six persons (four children), and seven persons (five children).

Ask each group to think seriously about how the family budget for four would likely be changed to the size they represent. Where would the childless couple spend less? Where more? How would the expenditures of larger families be different from the family of four?

Is a family of four the ideal size? Why or why not?

PURPOSE: To examine population pressures on wilderness areas.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT: As more people make use of dwindling resources, greater social and political regimentation results.

ACTIVITY: Persons living in congested areas often look forward to vacation time when they can visit national parks, wilderness areas, or open seashores. Outdoor recreation such as hunting and fishing continue to grow in popularity with increasing pressure on fewer available acres and good fishing sites.

Present to the class data such as that shown below from a U.S. Department of Interior yearbook. Engage the class in discussing personal experiences they or their parents have had in finding congested national parks or too many hunters or fishermen. Will it be possible for our present national park system to accommodate 250 million visitors a year? Why or why not? Under what limitations or conditions? Is access to national parks or hunting or fishing necessary for the "good life" as Americans perceive it?

If there is such a quality as "optimum population" for a given area, has that number been reached or exceeded in the U.S.A.? How can such a question be answered?

MILLIONS OF VISITS PER YEAR

MILLIONS OF PAID LICENSES PER YEAR

	1947	1964	2000
Hunting:	12.0	14.1	24.2
Fishing:	12.6 million	20.2 million	48.4 million

PURPOSE: To examine possible relationships between population growth and economic growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

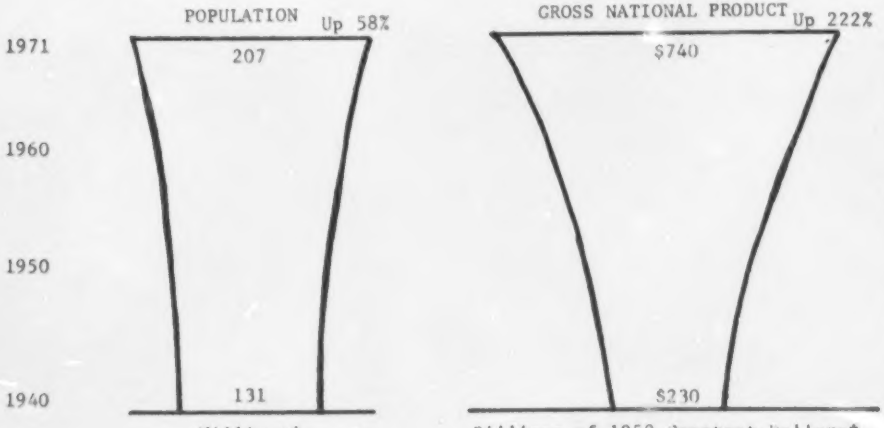
CONCEPT: Political instability seems probable as long as a few nations consume a disproportionate share of the earth's finite supply of resources including food.

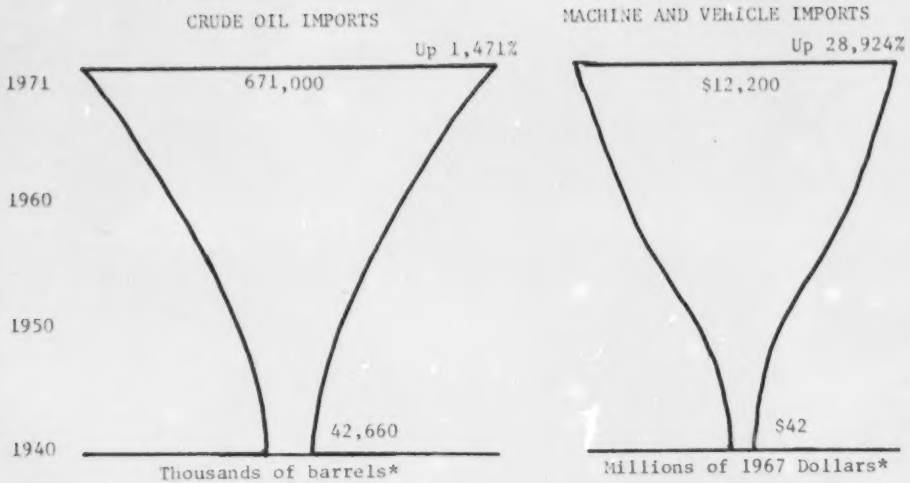
REFERENCE: ZPG National Reporter. November 1973.

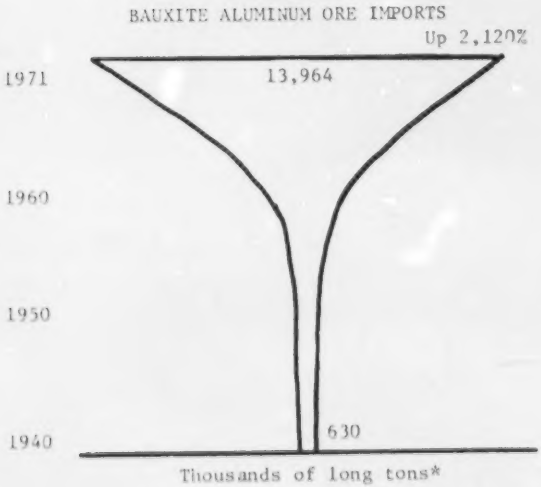
ACTIVITY: Present to the class by means of an overhead projector or on a duplicated handout the drawings shown on the following page from the reference cited above. The reference also included the following statement: "WARNING: These "mushrooms" are hazardous to our health - to our economy - to our country - to our world!"

Discuss questions that are obvious such as: How is it possible for gross national product to increase faster than population? Why have crude oil imports risen so dramatically? What has happened to oil imports since 1971? Why have bauxite ores increased so much? What, if anything, can be done to slow down oil and bauxite imports? Would this be a good idea? Why or why not?

Some persons concerned with world wide problems advance the idea that population growth in the United States is a more serious problem than population growth in lesser developed countries such as India. What support might be cited to support this idea?







*Source of data: Statistical Abstract USA, 1962 and 1972, Business Statistics 1971.

PURPOSE: To examine the nature of pronatalist customs.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to attitudes toward marriage and child-bearing.

ACTIVITY: At an appropriate time during a study of population or population-related studies such as food, energy, or natural resources shortages, suggest the importance of pronatalist customs in influencing birth rates. Pronatalist ("birth-favoring") customs or laws are aspects of human socities which tend to increase the birth rate. Giving special awards or bonuses to mothers of large families, as was done two decades ago in the Soviet Union, is a clear example. Lower tax rates for married people is another.

Divide the class into groups of three or four and ask each group to spend 10-15 minutes listing all the customs, social pressures, and laws they can think of that tend to increase the birth rate. Combine the lists into a master list on the chalkboard and discuss what the implications are to individuals or governments who are promoting smaller families and thus slower population growth.

PURPOSE: To demonstrate that a critical resource for human settlements in the past (water) may now present limits for future growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT: Carrying capacity caused by the interaction of population growth, resources, and technology is reached and often exceeded whenever pollution is indicated.

ACTIVITY: COMMUNITY WATER SUPPLY

The map below shows present and projected water shortages by region in the United States. Ask students to locate present water shortages in the Southwest and to trace projected shortages spreading East and North in the next 30 to 50 years. Do you live in one of these regions? Does someone you know live in one? How do these regions correspond to population growth rates and human settlement?

At the local level, problems may be more or less serious and they may occur at different times. Ask students to survey the water needs and supply in their own community. The following questions should be asked:

Do you know where the water you drink - the local water supply - comes from?

Does it come from wells? reservoirs? rivers or lakes?

How is it treated?

What are the dangers of pollution in this water supply?

How is it transported?

Does the community operate its own water supply or does it purchase it elsewhere?

What are the prospects for the future?

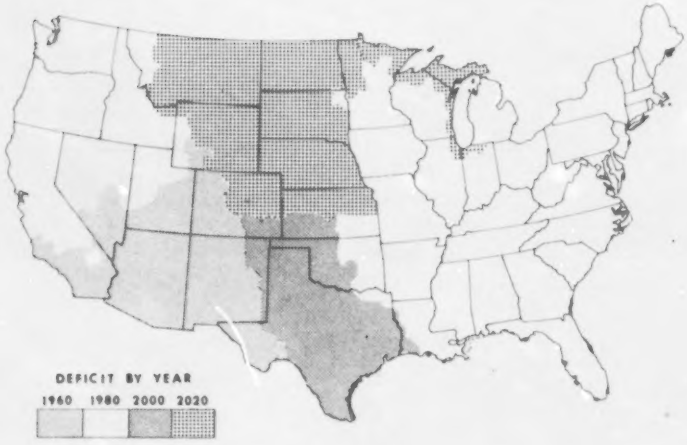
How much planning is made for the future water needs of the community?

How far into the future are plans being made?

What population estimates or assumptions for future community growth are used in estimating the demand for water?

What are the prospects for increased water costs passed on to consumers?

WATER DEFICIT REGIONS: 3-CHILD PROJECTION



Reprinted from OPTIONS with permission of The Population Reference Bureau.

PURPOSE: To examine factors associated with declining populations in selected cities.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

ACTIVITY: While considering the urbanization of America present data such as the following which indicates that metropolitan area growth is not synonymous with city growth. Without exception America's major cities have been the center of metropolitan growth but several cities have had marked reductions in their populations during the past 25 years.

Why has this occurred? What segments of the population have moved from the major cities to the suburbs? What segments have remained? Why?

What problems are aggravated in central cities by the so-called "flight to the suburbs"? What problems are commonly found in suburbs that are undergoing very rapid growth?

Attempt to apply the general questions posed above to the growth of urban areas well known to the students. Attempt, also, to have selected students contact leaders in the city and in the suburbs to get their perceptions of this problem. Engage the class in considering what, if anything, can be done to reduce problems associated with such patterns of growth.

Growth Patterns of Selected Cities*

City	Population 1970	Population 1950
Detroit	1,514,000	1,850,000
Cleveland	751,000	915,000
Boston	641,000	801,000
St. Louis	622,000	857,000
Pittsburgh	520,000	677,000

*Data from World Almanac; rounded to nearest thousand.

PURPOSE: To demonstrate behavioral changes in animals associated with overcrowding

LEVEL: Junior-senior high school

SUBJECT: Science

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

ACTIVITY: Many classrooms are easily supplied with a pair of gerbils and an aquarium.

Allow the gerbils to produce a litter. Separate two individuals of the same sex into an equal-sized aquarium as a "control". Supply both groups with adequate food and water. allowing the "experimental group" to freely interbreed. Have the students tabulate the size of the group as it increases. Discuss why and how it might stabilize itself over a year. (Many species have an internal hormonal response to overcrowding which affects the reproductive glands.)

Students should record any behavioral changes (isolation, gnawing on each other, refusal to mate, aggression) which might result from overcrowding. Discuss possible relationships to human conditions. Why can't a direct relationship necessarily be made? Ask the students to express their feelings about crowding. Do these feelings change as circumstances surrounding their origin change?

PURPOSE: To emphasize the world-wide concern for population problems.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Political instability seems probable as long as a few nations consume a disproportionate share of the earth's finite supply of resources including food.

ACTIVITY: Review with the class the fact that the United States uses more energy and natural resources per capita than any other country in the world. We own more automobiles, build more highways, produce more chemicals, use more air travel than any other country. We are first or second in producing pollution.

Review also the well known fact that millions of persons living in India are malnourished and on the verge of starvation. Indians use, compared to the U.S.A., much less energy and natural resources per capita. Environmentalists report that a child born in the United States will use, during his lifetime, at least 30 times as much of the world's resources than will an Indian child.

Ask for three or four volunteers on each side to debate before the class (after several days of preparation) the question, "Resolved that population planning in the United States is just as necessary as it is in India".

PURPOSE: To examine population concepts through class discussion.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Language Arts
Science
Home Economics

CONCEPT(S): Many

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, pp. 40-41.

ACTIVITY: You may find some of these questions regarding various population concepts appropriate for class discussion.

Why do we have millions more people today than we did 200 years ago? What has happened to the birth rate? What happened to the death rate?

What do you predict will happen if the human population continues to expand at its present rate indefinitely?

How can the population be controlled without loss of individual liberties?

If the human population expands without restriction will it mean the extinction of many other species now present on earth?

What are the effects of crowding on human behavior?

How does population affect pollution?

What needs to be done to ensure enough food for all humans today?

What products does man consume that are not replenishable?

How much space do we need to give each person a high quality of life?

Why did pioneers move? Is there any room for pioneering today? (Now that our country has four times as many people as it did in 1880.)

Would moving people from crowded areas of the world to under-crowded areas solve the world's overpopulation problem?

If the solution to overpopulation is to redistribute people, where do you think excess people should be moved? Who would have the authority to move them? How would people support themselves in these new areas? How would people be chosen to go? Would you be willing to go?

Is population growth an urgent problem for all the countries of the world or principally for the poorer countries?

Let's suppose there was a satisfactory solution to overpopulation, agreed upon by the governments of the world. How could the U.S. help other nations implement that solution?

How would our population distribution be affected if we had to depend on solar energy which is distributed evenly over the earth's surface, instead of concentrated sources of energy? Would it still be sensible to concentrate most of the population in a few small areas?

Would there still be wars even if population growth stopped completely?

Are we setting aside more parks, national monuments, and so on to accommodate our increasing population?

The black plague killed one person out of four in Europe in the 16th century. Would you say it had much effect on population growth?

Which is more of a threat to the world's resource supply--the birth of one American baby or the birth of five African, Indian or Latin American babies?

What are some of the ways other animal populations are kept in balance?

PURPOSE: To illustrate the interrelationship of the population/food dilemma.

LEVEL: Junior-senior high school

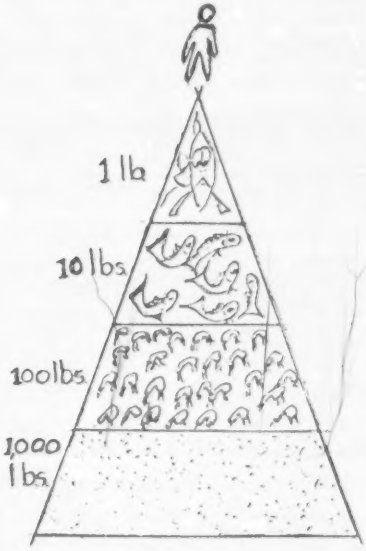
SUBJECT: Science
Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to resource demand and depletion.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 53.

ACTIVITY: Present to the class the data cited below relative to the "food pyramid" for man's supply of seafood such as tuna.

Discuss the feasibility and/or desirability of eating "lower" on the pyramid shown. Under what conditions might it become necessary to eat tiny sea animals or small fish? Are such conditions now present in any parts of the world? Why are these conditions generally not found presently in the United States?



Some people say we could help solve the world food crisis by eating from a lower level of the food pyramid. What does this mean? Here's an example:

> It takes 1,000 lbs. of microscopic sea plants to produce 100 lbs. of tiny sea animals, and 100 lbs. of these tiny animals to produce 10 lbs. of small fish, but 10 lbs. of small fish would only put one pound of meat on a big tuna. In changing 1,000 lbs. to 1 lb. of meat, 999 lbs. of food energy are lost or given off in heat along the way. One pound of fish would put hardly any weight on a human--it wouldn't even give him much energy.

PURPOSE: To examine the advantages and disadvantages of modern American agricultural practices.

LEVEL: Junior-senior high school

SUBJECT: Science

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

ACTIVITY: In response to the increased demand for food caused by rapidly growing populations world-wide the American farmer has increased his production dramatically. Yields, per acre, of wheat, corn, and other food grains are much higher than they were one or two generations ago. How can this fact be reconciled with the concern of some scientists and conservationists who say the soil in America is being harmed at an alarming rate?

Develop, with input from the class, a list of factors that are necessary to secure high yields of grain - factors such as soil, weather, water, seed, fertilizer, pesticides, and herbicides. Most highly productive farms also make heavy use of power machinery and practice some aspects of mono-culturing.

Ask students to do library research or interview persons such as county agents or other agricultural specialists (including those who urge more "organic farming or gardening") to get information on the negative as well as the positive aspects of heavy irrigation, heavy use of chemical fertilizers, pesticides, herbicides, and mono-culturing. Share findings in a subsequent discussion period. To what extent, if any, do some or all these factors have a harmful effect on a farmer's soil? Why might a farmer continue a practice he knows to be harmful?

PURPOSE: To examine advantages of early and late child-bearing.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to timing of marriage/child-bearing.

ACTIVITY: Population specialists from the Sierra Club report that teen-age mothers accounted for 17% of the births in the United States in 1975.

Divide the class into four groups. Ask each group to think seriously about the advantages and disadvantages of having children in one of the following age ranges:

15-19
20-24
25-29
30-34

After 20 minutes of group discussion ask for a spokesman from each group to report their conclusions to the class. Ask each group also to report on what they believe to be the "ideal age" for a mother to have her first child. Why did they select that age?

PURPOSE: To investigate the attitudes of various populations in a metropolitan area toward an expanded mass transit program.

LEVEL: Junio[illegible]enior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to provision of social services.

REFERENCE: A Structure for Population Education. Mary Turner Lane and Ralph E. Wileman. Carolina Population Center, University of North Carolina, Chapel Hill, N.C. 27514.

ACTIVITY: Involve the class in discussing the different transportation needs of various populations in a metropolitan area. Affluent populations living in the suburbs tend, generally, to rely on their automobiles for transportation to shopping centers, to doctors, to visit friends, and so forth. Inner-city populations typically rely more on mass transit such as busses.

The smog problem caused by excessive automobile exhaust emissions in several large cities and the rapidly escalating cost of superhighway construction has led many city planners to argue for an expansion of metropolitan transit programs along with a reduction of automobile traffic in the central city.

Divide the class into groups of three or four students. Ask each group to hypothesize what groups of people, institutions, or capital resource requirements might act as constraints to developing a good metropolitan transit system. Collect the group contributions into a class composite.

Arrange for someone in the metropolitan area who is promoting more mass transit to come to class and react to the ideas that were generated. If the person is unable to come to the school ask for a student volunteer to arrange for a telephone conference or visit to the appropriate office to get reaction to the class' ideas and report back to other students.

PURPOSE. To encourage students to consider alternative solutions to the population growth dilemma and varied perceptions of the problems associated with this dilemma.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT(S): Many

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 44.

ACTIVITY: A classroom debate on some aspect of the population issue is a good way to involve students with population concepts. Some suggested debate topics:

Man can adapt mentally to a greatly increased population density.

Overpopulation is a stimulus for progress.

Man should work toward increased food production in preference to population control measures.

Much of the earth is empty land which can be put under cultivation in order to meet the needs of population growth.

Farming the sea is a potential solution for the present and predicted world food crisis.

The U.S. can solve the world food shortage by sending its food surpluses overseas.

The U.S. should suspend foreign aid to countries whose rate of population growth outstrips their rate of economic growth.

Science will find a new way to feed everyone through development of synthetic foods.

If the earth becomes more crowded the value of human life will decrease.

Everyone should be free to have whatever size family he or she wants.

The U.S. has no population problem.

We can solve the crowding problem on earth by migrating to other planets.

Students might keep an on-running file or notebook of information from the media on population issues and thereby enhance discussion and debate.

PURPOSE: To demonstrate a requirement necessary to sustain present rate of population growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

REFERENCE: Jesse Lott, 2317 Boone Boulevard, Tallahassee, Florida 32303 in INTERCHANGE, Vol II, #2, July 1973. Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036.

ACTIVITY: A freeway is being planned within an urban areas. Use an overhead projector and make a hypothetical map of the area. Have students play the roles of city planners. Discuss why the freeway is needed, what alternatives are possible, and what impact the freeway will make on the lives of members of the community.

PURPOSE: To consider the desirability of changes in land use that are associated with population growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

ACTIVITY: Develop on the chalkboard with input from the students a list of land use changes that go on around any large growing city such as:

1. Good farm land is used for:

    a) Suburban housing developments
    b) Shopping centers
    c) Parking lots
    d) Enlarged or new airports
    e) Industrial parks.

2. The highway system is enlarged.

3. Flood plains and swampy marshland are often filled in to provide additional building sites.

After the list has been developed ask each student to rate individually and without class discussion the desirability of the change in land use as +, 0, or -, <u>from his personal viewpoint</u>. Record the ratings on the chalkboard and discuss the areas of greatest disagreement.

Ask each student to interview two persons older and two persons younger than himself to see if they believe the changes in land use are +, 0, or -. Urge that students try to interview different types of workers to see if they view the situation differently.

In subsequent class discussion try to determine consensus and disagreement among the respondent groups.

Is it desirable for a city, metropolitan area, state, or country to have a land use plan? Why or why not?

PURPOSE: To examine the relationship between population growth and pressure on recreation areas.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

REFERENCE: Population and the American Future. The Report of the Commission on Population Growth and the American Future.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

In considering the relationship between the economy and population growth, the Commission made the following statement:

> "We have looked for, and have not found, any convincing economic argument for continued national population growth. The health of our economy does not depend on it. The vitality of business does not depend on it. The welfare of the average person certainly does not depend on it."

The popular song writer, Cat Stevens, and members of the Commission on Population Growth and the American Future share a common concern: availability of recreation space.

More and more American families have the time, the money, and the inclination to enjoy the outdoors. With better roads and easier travel, national parks have in effect become city parks for the residents of nearby urban areas. The Commission's research revealed that in the past 10 years, visitors to all national parks more than doubled, while the area of the parks increased by only 20 percent. There are still many areas to enjoy and more to be developed, but the enjoyment will depend largely on how fast the population grows.

ACTIVITY: "Where Do the Children Play?"

Have the class listen to the song "Where Do the Children Play?" written by Cat Stevens in 1970. The song describes the "progress of mankind." It shows a difference, however, between "progress" that increases the quality of our children's lives and "progress" that may threaten it.

Use this song as a springboard for discussing the complexity of the concept of "progress" as well as for discussing the implications of population and economic growth. Encourage students to explore the different implications of population

and economic growth. Encourage students to explore the different implications for developing countries in contrast to industrialized nations.

WHERE DO THE CHILDREN PLAY?

Well I think it's fine building jumbo
planes, or taking a ride on a cosmic
train, switch on summer from a slot
machine, yes get what you want to,
if you want, 'cause you can get
anything. I know we've come a long
way, we're changing day to day,
but tell me, where d' th' ch'ldr'n play.

Well you roll on roads over fresh
green grass, for your lorry loads
pumping petrol gas, and you make
them long and you make them tough,
but they just go on and on, and it
seems that you can't get off. Oh, I
know we've come a long way, we're
changing day to day, but tell me
where d' th' ch'ldr'n play.

Well you've cracked the sky, scrapers
fill the air, but will you keep on
building higher 'till there's no more
room up there. Will you make us
laugh, will you make us cry, will you
tell us when to live, will you tell us
when to die? I know we've come a
long way, we're changing day to day.
But tell me, where d' th' ch'ldr'n play.

--Cat Stevens, "Where Do the Children Play?"
from the album, Tea for the Tillerman,
A&M Record Company, Hollywood, California.

QUESTIONS:

1. What is this song all about?

2. How does the author feel about the subject of this song? What words or phrases in the song make you think he feels this way?

3. Do you agree with Cat Stevens? Why or why not? Do you think what he says applies to your community?

4. One line says: yes get what you want to, if you want, 'cause you can get anything. What does the author mean? Do you think this phrase will be true as the population continues to grow?

5. Why do you suppose the author kceps repeating the title of the song after each verse? Why does he stress the urgency of acting now?

6. Playgrounds are just one example of things of value for our children that we may be losing. What are others? Discuss possible solutions or policies that might help us maintain those things we value.

PURPOSE: To illustrate the impact of a local decision limiting population growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

ACTIVITY: In 1972, Boca Raton, Florida, by means of a referendum petition, put a "growth cap" resolution on the November ballot. A resolution that reduced authorized expansion of projected building units from 65,000 to 43,000 passed 4:1. Each year hence, the resolution has been reviewed annually by the city and passed by substantial margins.

You are a member of the Boca Raton city council asked to implement this resolution by reviewing existing city zoning codes and other possible means. What do you suggest? Is it fair for a city to decide the quality of life its residents may desire and keep others from entering?

Have the class discuss this issue.

PURPOSE: To examine a problem associated with rapid population growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT: Population changes in the Unites States and other nations affect the individual and society as related to resource demand and depletion.

REFERENCE: The World Almanac and Book of Facts, 1974.

ACTIVITY: Ask the class to identify the five most populous states in the U.S.A. After several states have been "nominated" and placed on the chalkboard ask each student to identify his five choices and tally responses to indicate total class guesses. Follow this activity by presenting census data figures that, in 1970, identified the five as follows:

California	19,950,000
New York	18,240,000
Pennsylvania	11,790,000
Texas	11,200,000
Illinois	11,110,000

After comparing their guesses with "the facts" ask the class to identify the two states faced with present or soon to develop fresh water shortages. Use rainfall and/or topographic maps to show the inadequate rainfall in Southern California and huge areas of Texas. Use a political map to show the enormous growth of cities of 100,000 or more in the Los Angeles-San Diego area. Indicate these cities must "import" water for all uses, including irrigation of truck farms, from the Colorado River or from the Feather River in Northern California more than 600 miles away.

Southern California has a climate and life style that has attracted millions of persons to live there during the past 40 years. The area is now plagued by water shortage problems, extremely heavy freeway traffic, smog, and other conditions associated with dense populations.

What, if anything, could or should have been done years ago to avoid some of these problems? What, if anything, can or should be done now to insure that the problems don't get worse in the years ahead?

PURPOSE: To involve students in creative thinking about alternative solutions to the population dilemma.

LEVEL: Junior-senior high school

SUBJECT: Language Arts

CONCEPT(S): Many

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973, p. 43. (Activity suggested by Fred Bannister.)

ACTIVITY: If you teach creative writing on the secondary level, you might try this assignment.

Have students write two science fiction short stories about the society of 2015. The first story should be a predictive one based on information about current trends, and the second should be a prescriptive one describing a utopian society the student would like to see. Both stories should include flashbacks or hints showing their step-by-step development from the present situation.

PURPOSE: To clarify values toward marriage and child-bearing.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations.

REFERENCE: Population and the American Future. The Report of the Commission on Population Growth and the American Future.

REFERENCE: Adapted from OPTIONS with permission of the Population Reference Bureau.

Until modern times, high rates of reproduction were necessary to offset high mortality--especially infant mortality. In agricultural societies children were assets in the home- and farm-centered economy. Also, before care of the aged became institutionalized, parents had to rely upon their children for care in their old age. Large numbers of children were advantageous. As a result of these factors and of short life expectancy, American women spent most of their adult lives bearing and rearing four, five, or more children.

Long before the tradition of the large family disappeared, some couples had begun to adopt the small family pattern. As a result of declining mortality rates, a diminishing need for child labor in agriculture, increasing costs of raising a child in an industrialized urban society, and improved methods of fertility control, both the number of children desired and born declined.

Despite this trend, pronatalist pressures (those favoring childbearing) still exist. These include (1) the shaping of the young into sex-typed roles, with the boys pointed toward jobs and the girls toward home and motherhood; (2) discrimination against the working woman and especially against the working mother; and (3) restrictions on higher education for women. Such forces are so pervasive that they are typically perceived as natural forces and not simply as cultural prescriptions.

ACTIVITY: As a way of illustrating these factors, a simple survey activity is suggested for use before classroom discussion. Use the following questionnaire to measure the attitudes of your students.

In tabulating the results, look for the following patterns: Most persons will probably indicate plans for marriage and childbearing that are quite similar--revealing conditioning by cultural and social forces. Note those who do not expect the female to work after marriage: are there differences in male and female responses? Do the answers to the questions

on number of children expected and number desired differ? If the same, mention the Commission's finding that 44 percent of all births from 1966 to 1970 were reported as unplanned and 15 percent as unwanted.

In light of the results of the survey and after participants have had a chance to analyze and discuss their own attitudes, offer the following statement from the Commission for further comparison:

> "The objectives for American society should be to make the childbearing decision as free as possible of unintended societal pressures: it should not be to "force" people to become parents in order to seem "normal", but to recognize that some people, and perhaps many, are not really suited to parenthood. We should strive for the ideal of diversity in which it would be equally honorable to marry or not, to be childless or not, to have one child or two or, for that matter, more. Our goal is one of less regimentation, not more."

SURVEY: MARRIAGE AND CHILDBEARING

1.	Female_____ Male_____	
2.	Do you plan to marry?	Yes_____ No_____
3.	If yes, at what age do you plan to marry?	Age_____
4.	If female and you plan to marry, do you plan to work after marriage?	Yes_____ No_____
5.	If male and you plan to marry, would you like your wife to work after marriage?	Yes_____ No_____
6.	If female how long will you work? If male how long should your wife work after marriage?	Years_____
7.	If you plan to have children, at what age would you expect to have your first child?	Age_____
8.	How many children do you want to have?	Number_____
9.	How many children do you expect to have?	Number_____
10.	At what age would you expect to comp'ete your childbearing?	Age_____

Do you agree or disagree with the following statements:

		Agree	Disagree
11.	Part of the fulfillment of everyone's life is in marriage.	_____	_____
12.	Part of the fulfillment of everyone's life is in having children.	_____	_____
13.	A childless or a single-child family may have as fulfilling experiences as other families.	_____	_____
14.	If a couple has the number of children they want, but all are of one sex, they should keep trying for a baby of the other sex.	_____	_____
15.	All American couples should have two children in the interests of stopping population growth.	_____	_____
16.	Woman's place is in the home.	_____	_____
17.	After marriage and childrearing, women should continue working.	_____	_____
18.	Because most women marry and leave work when children are born, minor forms of job and pay discrimination must be expected.	_____	_____
19.	Unmarried women who are in their 40's and 50's are lonelier than unmarried men of the same age.	_____	_____
20.	There is something strange about men or women who do not want to get married and have families.	_____	_____
21.	There is something strange about a married couple who decide not to have children.	_____	_____
22.	A woman should have the right to decide whether she wants to bear a child.	_____	_____
23.	Men and women should share equally in the rearing of and caring for children.	_____	_____
24.	Women should stay home and primarily be wives and mothers.	_____	_____

PURPOSE: To illustrate limits to growth.

LEVEL: Junior-senior high school

SUBJECT: Science

CONCEPT: The world population is currently increasing at an unprecedented rate and in unprecedented numbers. The earth as a finite system cannot accommodate these increases indefinitely.

REFERENCE: Developed during the 1972 NSF Summer Institute at the University of Cincinnati by Ms. M. Pacynski, St. Mary Center for Learning, Chicago, IL.

ACTIVITY: Set up the apparatus shown below in which the earth is represented by the glass ball and the level of liquid inside represents the population size. The purpose of the model is to illustrate the impact of various birth and death rates on population size, and to indicate that a balance must ultimately be obtained. Three models can be shown: high birth rates/high death rates (the human population until eighteenth century); high birth rates/low death rates (developing countries of today); low birth rates/low death rates (developed countries of today, with some countries at zero population growth).

An appropriate analogy is to compare the earth and its people to a space capsule and the number of astronauts it can support over a period of time. Each system is self-contained and finite.

This model does not take migration into account, nor does it illustrate distribution or density.

QUESTIONS:

1. If you open the top stopcock, what happens to the population level? What causes population levels to increase?

2. If you open the bottom stopcock, what happens to the population level? What causes population levels to decrease?

3. Look at some relationships between birth and death rates, and make the model illustrate them to you.

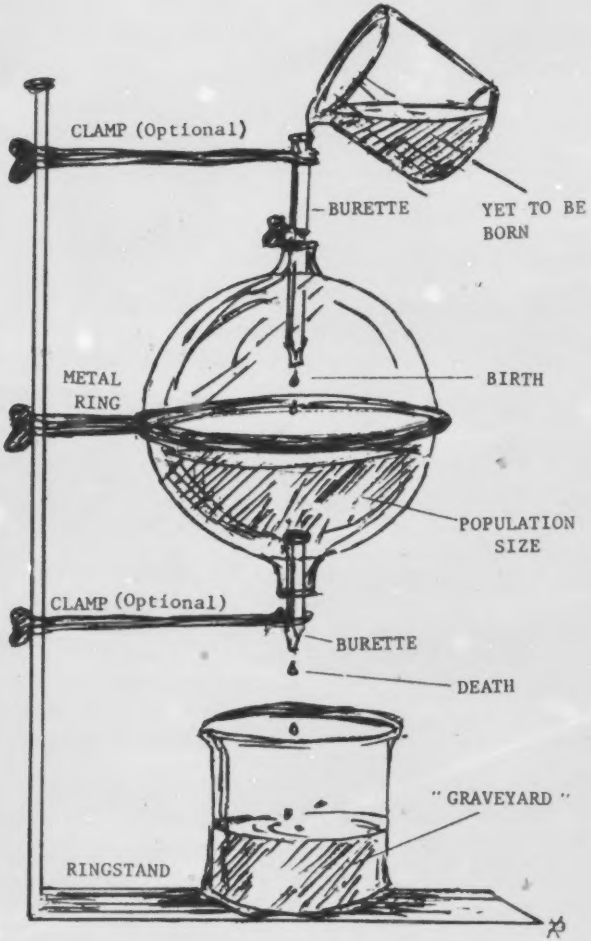
If birth rate is:	and death rate is:
High	High
Low	Low
Low	High
High	Low

population size: (increases, decreases, remains the same)

4. Does the glass ball ever become filled to capacity? When?

5. Can anything be done to make more room?

6. In what way does the concept "spaceship earth" represent substantial changes in our thinking?



PURPOSE: To examine views held by some minority group persons concerning population growth.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Struggles of many families and nations to develop economically are prolonged and made more difficult by rapid population growth.

REFERENCE: Population and The American Future. The Report of the Commission on Population Growth and the American Future. pp. 72-74.

Reprinted from OPTIONS with permission of the Population Reference Bureau.

ACTIVITY: The history of race relations in our nation has left a legacy of fear and suspicion concerning the implication of "population policies." Five minority group members testifying before the Commission offered examples of such suspicion. Distribute the following statements as initial points for discussion. To what extent are the concerns of these spokesmen real or imaginary?

Excerpts from Testimony by Minority Group Members:

DR. EUGENE S. CALLENDER, President of the New York Urban Coalition:

Within this country, Blacks, Indians, Chicanos, Puerto Ricans, and Orientals feel that such [population] control is solely to the advantage of the majority population. Minority groups at this point in history do not feel that they can afford to trust that the "nobler instincts" of the white majority will prohibit the resurgence of subtle and overt forms of racism.

BLACK WITNESS AT THE WASHINGTON HEARINGS:

If this [ecology] movement also talks about fewer people, the question of "who gets to survive" is raised. So, to us, it becomes "every man for himself" now, because we have no reason to expect that we won't get the worst of this one, too.

SPANISH-SPEAKING WITNESS IN LOS ANGELES:

The only way we will get groups like yours to be responsive to our needs is through sheer weight of numbers. [It may be that] what we must do is to encourage large Mexican-American families so that we will eventually be so numerous that the system will either respond or it will be overwhelmed.

THE REVEREND JESSE JACKSON, black minister from Chicago:

You have to recognize that the American group that has been subjected to as much harassment as our community has is suspect of any programs that would have the effect of either reducing or levelling off our population growth. Virtually all the security we have is in the number of children we produce.

BLACK WITNESS FROM LITTLE ROCK, ARKANSAS:

I suggest to you that many of us who are advantaged have a vested interest in keeping the disadvantaged exactly where they are. Our economic and political strategies are clearly designed to keep a segment of our population poor and powerless. I suggest that many of our social welfare programs have failed and are failing to help the poor and oppressed among us because they were never intended to help them.

PURPOSE: To stimulate discussion of pronatalist attitudes and an awareness of men's and women's roles.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to numbers and types of roles available to men and women.

REFERENCE: Activity developed by participants of a 1971 NSF Summer Institute, University of Cincinnati.

ACTIVITY: MOTHER OF THE YEAR CONTEST

Ask the class to study the profiles of six women who are candidates in a MOTHER OF THE YEAR contest. Allow the class to discuss briefly the unique qualification of each candidate. Divide the class into groups of five or six students and continue the discussion utilizing questions at the end of the activity. Each group has the assignment to select ONE from the six regional winners whose qualifications are described below. The selection must be the UNANIMOUS decision of each group.

A spokesperson for each group will be asked to give the reasons each candidate was selected or rejected. Ultimately, after adequate discussion, ask each class member to vote on his or her selection.

CANDIDATES:

MS. ANN SEMMLER, San Francisco, CA

Sponsor: Association for Voluntary Sterilization
Age 29--husband is sales representative for IBM--won court case establishing the right to be sterilized regardless of number of children--adopted her two children--a boy four and a girl two--graduated Phi Beta Kappa from Vassar--teaches a course on Women's Rights at the University of California, Berkeley--president of local chapter of NOW--member of Zero Population Growth and Sierra Club--hobby: gourmet cooking.

MRS. JUNE HUNTER, Boise, ID

Sponsor: American Association of University Women, Greater Boise Branch

Age 37--husband manages Montgomery Ward Store in Boise--mother of 3 boys, all honor students in high school and junior high-- BS, Idaho State University; MS, University of Idaho--elementary school teacher, 10 years experience--past president Idaho Education Association--presently programming a new math series for slow learners--led push for equal pay for equal work for women teachers and State employees--Democratic candidate for Idaho House 1974.

MRS. JEAN FIXON, Cedar Bluffs, NE

Sponsors: Lincoln Kiwanis Club and Daughters of the Pioneers, Nebraska Chapter

Age 72--mother of eleven, grandmother of 73, great-grandmother of 29--resides on farm, built 160 acre homestead into 2000 acre dairy and fruit farm--one of the original homesteaders of Nebraska, she and late husband built sod hut as their first home--Nebraskan "Mother of the Year" in 1954 and again in 1969--stated in recent newspaper interview, "Children are the spice of life and the salt of the earth".

MS. JOANN GREEN, Chicago, IL

Sponsor: Cook County ZPG

Age 32--unmarried--one son, four years old--lives with environmental lawyer, past 3 years--MA from the University of Chicago in Sociology, Magna Cum Laude--organized Chicago chapter of NOW--presently writing book "The Future of Women in Eliciting Corporate Responsibility"--refused honorary doctorate from Antioch College as irrelevant--organized a day care center which involves both men and women and provides family-like relationships for the children.

MRS. BETTY BAKER, Syracuse, NY

Sponsor: Syracuse Chamber of Commerce

Age 49--immigrated from England in 1947--husband is prominent corporation lawyer--mother of five girls and three boys, five are graduates of CCNY, three in high school; one son has doctorate in nuclear physics from MIT, one is in cancer research--graduated from high school at age 40--same class as second daughter--Girl Scout leader since 1953--Matron of Eastern Star--Republican precinct worker--Ruling Elder, Episcopal Church--winner of Syracuse Women's Club's Outstanding Woman of the Year, 1959.

MRS. JAYNE WATSON, Atlanta, GA

Sponsor: Retail Clerks Union, AFL-CIO
Age 52--migrated from Montford, AL, after husband died five years ago--mother of five plus two adopted children--three sons have been killed in service--last death in Vietnam War--employed as a clerk in a chain supermarket--does considerable volunteer work at Community Action Center--member of NAACP for 15 years--not in leadership role--winner of Montford County Fair Cooking Contest in 5 of 8 years she entered.

1. What qualities did you consider most important in your selection? Which did you consider weaknesses? Why?

2. Would your selection be the same if you were asked to choose one of these women to be your own mother? Your own role in life (if female) or your wife (if male)?

3. What trends and issues influenced your selection? Would your choice be the same if you were older? Younger?

4. What is an ideal family size? Take a poll of your classroom and figure the average number of children desired. Compare this to the average number of children per family needed because of the U.S. current age distribution/immigration policy to achieve Zero Population Growth (1.4).

5. What attitudes and trends in our society encourage continued population growth? Do these attitudes have any other effects?

NOTE: The teacher may wish to substitute real individuals who appear before the class for 5 minutes to support their candidacy. A profile of each person and photograph could be put on the bulletin board in advance of their appearance.

PURPOSE: To learn components of decision-making related to land-use.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to land use.

ACTIVITY: (Adapted from ENVIRONMENT AND MAN. Richard H. Wagner. 1971. W. W. Norton and Company, Inc.)

The question that often arises in suburban or rural areas is whether to develop land suitable for housing or for other uses. The town of Closter, New Jersey, when faced with a controversy over its attempt to acquire eighty acres for an open space program, made some calculations and drew the following conclusions: eighty acres would allow the construction of 160 houses, which would bring at least 200 new children into the local school system. The costs to educate each child per year were $720. How much per year would the new educational burden cost the town? In addition, the added solid waste would cost $4,000 to collect, $6,000 more for police protection, and $2,000 for extra fire hydrants and miscellaneous services.

Tally the total annual costs to this community if a decision is made to develop the land or leave it as a green belt?

Collect cost data from your community in a similar way:

- Annual educational cost per child
- Garbage collection cost per family
- Cost of fire hydrants
- Cost of police protection
- Etc.

Attend a public hearing with your students where a debate over land development is being conducted. Bring your data and add it to the public testimony.

PURPOSE: To assist students in approaching local growth issues on an interdisciplinary basis.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to formation of governmental policy.

REFERENCE: Reprinted from OPTIONS with permission of The Population Reference Bureau.

POPULATION POLICY

The Commission on Population Growth and the American Future made a definite judgment about the choice the nation should make about future growth. After studying the effects of future growth alternatives on our economy, society, government resources, and the environment the Commission found "no convincing argument for continued national population growth."

The Commission then offered its recommendations with careful statements of policy goals so that we could reach informed and deliberate decisions about population growth and distribution, not only at the national level, but in states and local communities as well.

ACTIVITY: Planning Population in the State of Vermont

It has finally happened! Vermonters were not able to act quickly enough. Vermont has fallen to the counterculture. The process started slowly as large numbers of youth moved into the state but gathered steam as more and more natives, fearful of the long-haired newcomers moved to New Hampshire and up-state New York. But now the newcomers control the state and constitute nearly 65 percent of the population. The median age of the state's population has dropped to 26.8 years (half of the population above, and half below 26.8 years). The birth rate is soaring. Unemployment is rampant and to make it worse, a Burlington newspaper reports that there are now more poets and unpublished novelists in agriculture than there are experienced farmers. Migration of 16-25 year olds, including a large number of unmarried teenage girls who are pregnant, continues.

This situation offers provocative material for a discussion of population policy.

The group should be divided into three sections. The first includes expert demographers who will assess the facts. The second will serve as a commission that will formulate new

policies. The third group are native Vermonters who will attempt to develop ways to attract their fellow citizens back from New Hampshire.

The three groups may work outside of the class until the demographers have prepared their report for evaluation by the others. Then the commission should conduct its deliberations while hearing from the Concerned Vermonters.

While this exercise is being carried out, the students may be directed to Chapter 9 of the Commission's Report, "Population Policy," pp. 75-78. The chapter on immigration, Chapter 13, may be useful for the Concerned Vermonters. Use the table on age-sex structure as well as the map showing county population change between 1960 and 1970 on page 65. Other resources might include:

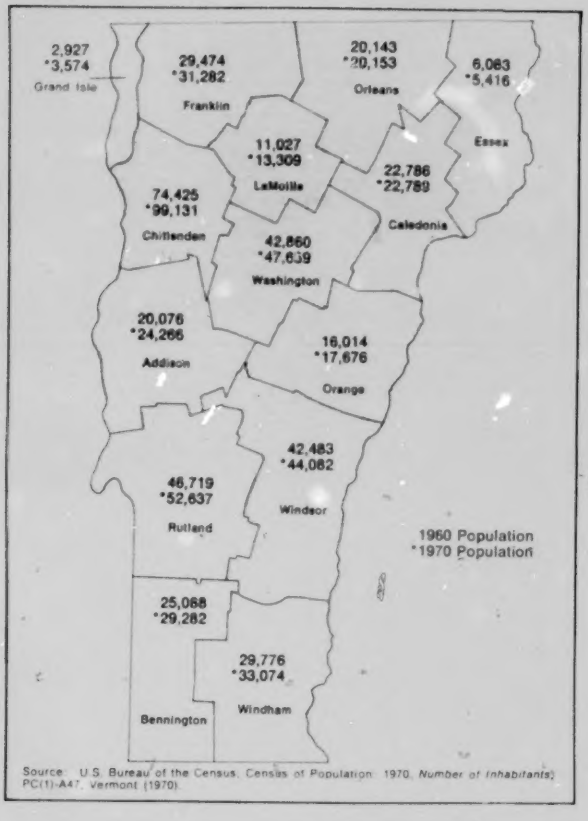
U.S. Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics, PC(1)-C47, Vermont (December 1971); and U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earning States and Areas, Bulletin 1370-8 (1972).

VERMONT
AGE-SEX STRUCTURE, 1970

	Male		*Female*	
	Population	% Distribution	Population	% Distribution
All ages	217,166	100.0	227,164	100.0
Under 5 yrs.	20,294	9.3	19,364	8.5
5–9	23,523	10.8	22,382	9.9
10–14	23,715	10.9	21,937	9.7
15–19	21,933	10.1	22,464	9.9
20–24	17,403	8.0	18,606	8.2
25–29	14,452	6.7	14,472	6.4
30–34	11,979	5.5	11,769	5.2
35–39	11,315	5.2	11,398	5.0
40–44	11,731	5.4	12,238	5.4
45–49	11,510	5.3	12,260	5.4
50–54	10,934	5.0	11,589	5.1
55–59	9,906	4.6	10,693	4.7
60–64	9,067	4.2	9,908	4.4
65–69	7,040	3.2	8,617	3.8
70–74	5,355	2.5	7,358	3.2
75+	7,009	3.2	12,109	5.3
median age	25.6		28.1	

Source: U.S. Bureau of the Census, Census of Population: 1970, *General Population Characteristics*, PC(1)-B47, Vermont, table 21 (1971).

VERMONT COUNTIES



CHARGES TO THE GROUPS:

GROUP 1: You are the experts on population, sociology, government, and economics. The State of Vermont is in a novel position due to the situation described in the article. Within the constraints set by this description, design a report on the demographic and social situation of Vermont. Use the Commission Report as a source of insights and some of the 1970 census data for Vermont provided below as the basis for your calculations of the demographic situation. Make your report challenging but plausible.

GROUP 2: You are the Commission of Population Growth and the Future of Vermont. While you await the report of your demographic experts, you must begin your deliberations. You

already know that the economy is in disarray and the influx of new persons--many with real problems--is adding a huge burden to your already strained social services. What recommendations will you make? In the process, you must give a careful hearing to the Committee of Concerned Vermonters who have definite views on the problem.

GROUP 3: You are the Committee of Concerned Vermonters. You want to regain control over the state, but there are only four possibilities: (1) native Vermonters must increase their fertility, (but this is not easy given the fact that median age of the group is 30.2 years); (2) the newcomers will need to control their fertility; (3) large numbers of newcomers will need to return to their former states; or (4) somehow those Vermonters who left must be encouraged to move back from New Hampshire and elsewhere.

PURPOSE: To compare major concerns of developed and developing countries.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to provision of social services.

REFERENCE: 1975 World Population Data Sheet. Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036.

ACTIVITY: Present to the class the data shown below that indicates the median age and the life expectancy of populations in five developing and five developed countries.

Review with the class the general principle that the needs of persons from birth to age 16 tend to be quite different from the needs of persons aged 30-70.

Divide the class into groups of three of four students. Ask half of the groups to develop lists of needs that would be very important in the five developing countries. Ask the other half of the groups to do the same for the developed countries.

After working at the assignment for 10-20 minutes ask each small group to report its conclusions to the class and record on the chalkboard. What needs are common to both types of populations? What needs are quite different? Which types of problems must governments deal with in developing countries? In developed ones?

Country	Median Age (Yrs.)	Life Expectancy at Birth (Yrs.)
Nicaragua	15.7	53
Ghana	16.2	44
Ethiopia	16.7	50
Bangladesh	16.7	36
Laos	18.9	40
U.S.S.R.	22.3	70
U.S.A	28.6	71
Denmark	33.2	74
Sweden	35.0	73
Luxembourg	36.0	71

PURPOSE: To facilitate an understanding of U.S. immigration policy.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to changes in immigration.

REFERENCE: Reprinted from OPTIONS with permission of The Population Reference Bureau.

Historically, immigration has contributed significantly to the growth and development of the United States. Immigrants now enter this country at a rate of about 400,000 per year. The relative importance of immigration as a component of population growth has increased greatly in the past decade as declining birth rates diminish the level of natural increase.

If immigration were to remain at 400,000 per year and all families were to have an average of two children, then immigrants arriving between 1970 and 2000, plus their descendants would account for almost a quarter of the total population increase for that period. Once zero growth was reached, the size of the population would ultimately be about 8 percent larger than if there were no international migration.

Immigration affects not only the growth of the population, but also its distribution. Immigrants tend to settle in the largest cities. Assuming the 2-child growth rate immigrants will contribute about 23 percent of the projected population growth within fixed metropolitan boundaries between 1970 and 2000.

Under the U.S. Immigration and Naturalization Act of 1965, "preference" categories were established for classifying applicants for immigration. Applicants are classified according to relationships with persons in the U.S. or job skills. Preference categories include:

1. Unmarried sons or daughters of U.S. citizens
2. Spouses of resident aliens
3. People with certain professions or skills
4. Married sons and daughters of U.S. citizens
5. Brothers and sisters of U.S. citizens
6. Workers in certain categories that are in short supply in the United States
7. Refugees

Spouses and children of preference applicants are entitled to the same preference if accompanying or following such persons.

ACTIVITY: Reproduce Tables 1 and 2 for group discussion. Table 1 compares immigration from various world regions for the years

1960, 1965, and 1970. Ask students to interpret what was happening to American immigration between 1960 and 1970. Note the dramatic shifts in the pattern of immigration. What groups are declining in number? What groups are increasing? Why? Discuss these shifts as a consequence of the 1965 Immigration Law that established preference categories.

Table 2 offers figures on illegal immigration in 1970. It is impossible to estimate precisely how many escape detection. Estimates of the number of illegal aliens currently in the United States run between 1 and 2 million.

Ask students to determine from the table which category of aliens required to leave the country is the largest. What is the most likely reason for these persons entering the United States? The reason for their deportation?

Table 1.

U.S. IMMIGRANTS, BY REGION OF BIRTH, 1960-1970

	1960	1965	1970
All countries	265,398	296,697	373,326
Europe	139,670	114,329	118,106
Asia	24,071	19,778	92,816
North America	85,075	126,729	129,114
South America	13,048	30,962	21,973
Africa	2,319	3,383	8,115
Australia and New Zealand	912	1,066	2,280
Other Countries	303	450	922

Source: U.S. Bureau of the Census, STATISTICAL ABSTRACT OF THE UNITED STATES 1971 (1970), chart 133, p. 9.

Table 2.

DEPORTABLE ALIENS APPREHENDED DURING 1970-71 AND THEIR DISPOSITION

Type of Aliens		Number	Percent of Total
Entered illegally		244,492	71
Entered legally, subsequently violated status		100,861	29
Immigrants	2,670		
Visitors	64,163		
Students	5,238		
Crewmen	15,381		
Temporary agricultural workers	639		
Other	12,770		
Total		345,353	100
Aliens deported		16,893	5
Aliens required to depart		303,348	95
Crewmen	11,957		
Direct required departures under safeguard, mainly Mexicans entering without inspection	239,810		
Other	51,581		
Total		320,241	100

Source: U.S. Dept. of Justice, 1970 ANNUAL REPORT OF THE IMMIGRATION AND NATURALIZATION SERVICE (1971), pp. 12, 22, 87.

PURPOSE: To demonstrate differences in age structure in various nations and to explore implications thereof.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including graphical representation of data.

REFERENCE: Reprinted from OPTIONS with permission of The Population Reference Bureau.

Because of a history of relatively high birth rates in the United States, for a long period our population was considered "young" compared with that of European countries. In the past century, however, our population has been growing "older" due to the long-term downward trend of the birth rate.

This trend was interrupted by the postwar baby boom which has significantly affected the nation's age structure (the proportion of persons at each age). Members of the baby boom generation are now moving into adulthood and in the twenty-first century will join the ranks of older citizens.

One way to study age structure and its implications to the society, its economy and services, is through the use of age pyramids. An age pyramid provides a visual image of the age structure of a society. The vertical axis shows different age groups. The horizontal axis shows the number of people in each age group. What causes changes in the age structure? High birth rates, as mentioned above, produce large numbers of children and give the pyramid a larger base. On the other hand, low or falling birth rates produce a smaller proportion of children in the total population and give the pyramid a narrower base.

Death rates also change the shape of the pyramid. As death rates rise for any particular age group, e.g., young men in time of war, the band representing that age group would be smaller. If fewer infants and children die and if people in general live longer, we say the survival rate is increasing. Changing survival rates will affect the shape of the pyramid at several ages. For example, if infants survive to the reproductive age, the children they bear will increase the base of the pyramid.

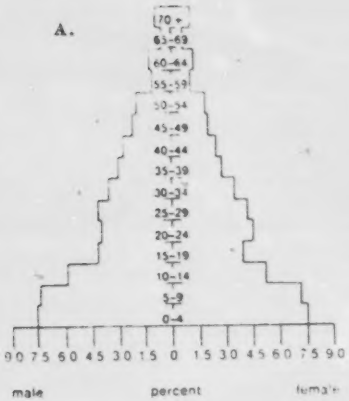
Migration is the fourth major factor that affects age structure. When people of a particular age group leave the country, they change the age structure of the area they are leaving as well as that of the region to which they are moving.

A general distinction is often made between the age structure of industrialized and less developed countries. An age pyramid with a broad base that narrows rapidly toward the top is typical of a less developed society with high birth and death rates. An age pyramid that is fairly

evenly distributed from bottom to top is typical of a more industrialized society with low birth and death rates.

ACTIVITY: The following three age pyramids could be used to introduce the idea of age structure. They should be introduced to students without revealing the names of the countries. For teacher reference: a--India; b--United States; and c--Costa Rica.

A.



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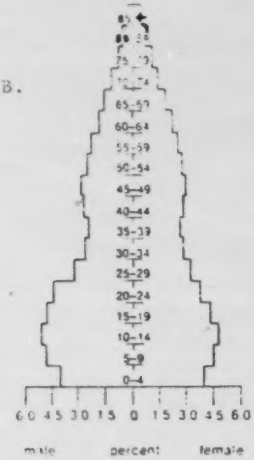

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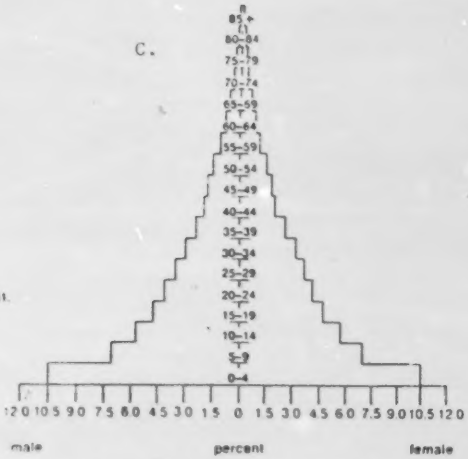

Source: Donald J. Bogue, *Principles of Demography* (John Wiley, 1967), p. 151.

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Questions:

1. How are the three figures similar? How are they different?

2. What factors may account for the differences?

3. What kind of country (industrialized/agricultural do you think each of these charts represents? Why?

4. What effects would each have upon the economy and provision of social services in the respective nations?

PURPOSE: To examine one aspect of population movement in the United States.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

REFERENCE: The World Almanac and Book of Facts, 1974.

ACTIVITY: Review with the class data such as that shown below which indicates the nine cities in the United States with the largest black populations in the last census. Note that only two cities (Baltimore and Houston) are located in states that had a relatively large black population 100 years ago.

Out of students' current awareness of social forces and problems engage the class in discussing questions such as the following:

1. What factors were responsible for large migration of American blacks to northern cities? Are these factors still operating?

2. What factors were responsible for creating the "black ghetto" areas found in northern cities? Are these factors still operating?

3. Most cities gaining in percentage of black population are losing in total population. Why? What problems are related to this phenomenon?

City	Negro Population in 1970
New York City	1,670,000*
Chicago	1,100,000
Detroit	660,000
Philadelphia	650,000
Washington, D.C.	540,000
Los Angeles	500,000
Baltimore	420,000
Houston	320,000
Cleveland	290,000

*Rounded to nearest 10 thousand.

PURPOSE: To examine factors related to population growth in the world's largest countries.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry.

REFERENCE: "Interchange" Population Education Newsletter, Vol. 5, No. 3, May 1976. Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036.

ACTIVITY: Present to the entire class by means of a transparency projection the 1976 population data for the world's ten largest countries shown below. Present next the data for 1932. What changes occurred during that period of time? Present, finally, the projected data for the year 2000. What new countries are now emerging?

ESTIMATED POPULATION OF THE WORLD'S TEN LARGEST COUNTRIES
(IN MILLIONS)

1932		1976		2000	
1. China	425	China	837	China	1126
2. India (Br)	360	India	621	India	1051
3. USSR	160	USSR	257	USSR	314
4. United States	125	United States	215	United States	263
5. Japan	66	Indonesia	135	Indonesia	230
6. Germany	66	Japan	112	Brazil	208
7. Indonesia (Neth)	63	Brazil	110	Pakistan	146
8. United Kingdom	46	Bangladesh	76	Bangladesh	145
9. France	42	Pakistan	73	Nigeria	135
10. Italy	42	Nigeria	65	Mexico	134

Source: 1932 *Demographic Yearbook, 1948*, United Nations, New York, 1949. 1976 and 2000: *1976 World Population Data Sheet*, Population Reference Bureau, Inc.

List on the chalkboard the names of the present ten largest countries. Provide space to list beside each country its rank (1 through 10) on the following demographic factors:

(1) Birth rate

(2) Rate of population growth

(3) Infant mortality rate

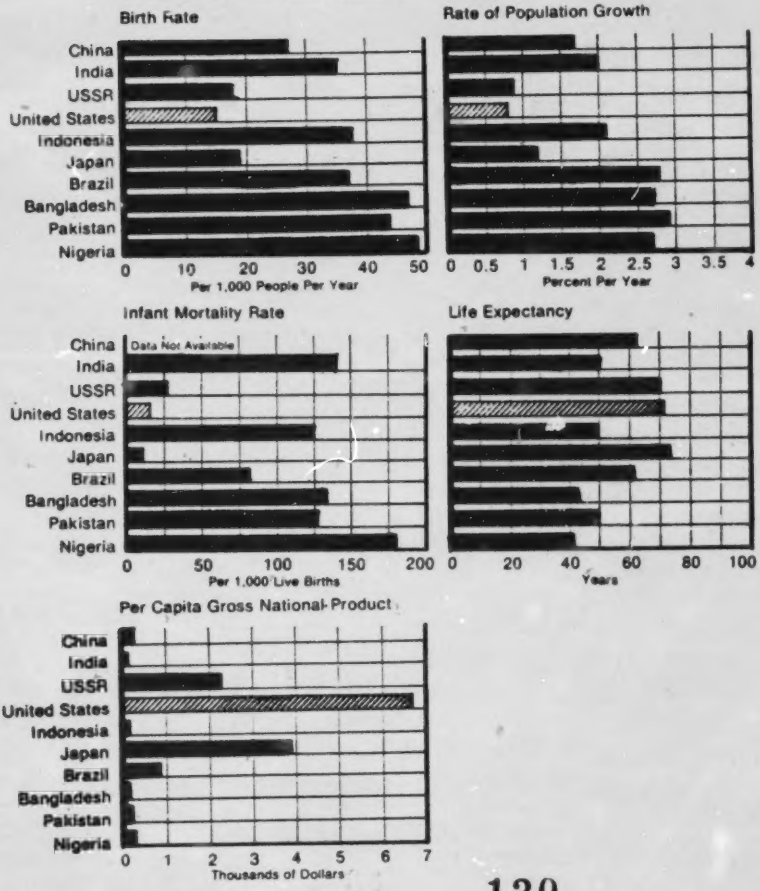
(4) Life expectancy

(5) Per capita gross national product.

Present by transparency or worksheet the data also shown below on the above five factors and ask students to specify the rank for each country on each factor.

Discuss questions that become apparent such as what is the relationship between birth and infant mortality rates? Between birth rates and per capita GNP? What accounts for several Western European countries dropping out of the most populous list? What, if anything, do the data suggest for the future?

1976 DATA FOR THE WORLD'S TEN LARGEST COUNTRIES



PURPOSE: To clarify fundamental differences in opinion concerning local population growth and distribution.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Science

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographical dislocations.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

Americans are a metropolitan people, and our transition from rural to metropolitan has been rapid. Around the year 1960, about 70 percent lived in metropolitan areas--cities of 50,000 or more, and the county or counties that are part of the city's economic network. By the year 2000, 85 percent of us will be metropolitan residents.

Between 1960 and 1970, the population of the United States grew 13 percent, while the metropolitan population grew 23 percent. What are the sources of metropolitan growth? In the 1960's, about three-fourths of the growth was natural increase--the excess of births over deaths.

This rapid change means different things to different people. To the man in Los Angeles, it means rapid growth throughout Southern California. This often leads to unplanned and haphazard development, ignoring the aesthetic potential of the natural surroundings. Tract housing developments are marked off by smoggy and noisy expressways. Prosperity collides with a fragile environment.

To a housewife in Nebraska, it means the loss of population in her small farming town which reached its peak population in 1920. Family, friends, and neighbors, particularly the young and better trained, have moved away. Tax revenues are shrinking and essential public services are becoming more limited. She and her husband can remain where they are, but only at the cost of a difficult and uncertain livelihood.

To minorities in the central cities, the process of metropolitan growth means discrimination that keeps them in a ghetto area with crumbling old apartments and abandoned houses. And it means that it is harder than ever to reach the jobs opening up in the suburbs as companies shift their operations outward.

ACTIVITY: The table below may be used to begin a discussion on urban migration and rural depopulation.

U.S. COUNTIES GAINING OR LOSING POPULATION, 1960-1970

Type of county	Total counties 1960	Counties gaining population 1960-70	Counties losing population 1960-70	Percent counties losing population
All types	3,098	1,742	1,356	43.8
Urban	831	604	227	27.3
Rural	2,267	1,138	1,129	49.8
Partly urban	1,292	772	520	40.2
Entirely rural	975	366	609	62.5

Source: Population Studies Group, Economic Development Division, Economic Research Service, U.S. Department of Agriculture.

NOTE: Urban counties have 50% or more of the total population residing in urban areas (places of 2,500 or more persons). Rural counties are all those counties not classified as urban and are subdivided into two types. Partly urban counties have some urban and some rural areas, but less than 50% of the total population lives in urban areas. Entirely rural counties have no urban areas.

QUESTIONS:

1. What trends can you identify from the data?

2. What kinds of problems would this pattern of migration create for rural areas? For metropolitan areas?

PURPOSE: To clarify reasons for choices in fertility planning.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

REFERENCE: Population and the American Future. The Report of the Commission on Population Growth and the American Future.

ACTIVITY: Use the chart, "Unwanted Fertility in the United States, 1970," which gives figures both by race and education. Provide copies to students and discuss the contents by using the six questions below.

UNWANTED FERTILITY IN THE UNITED STATES, 1970[a]

Race and Education	Most likely number of births per woman	Percent of births unwanted 1966-70	Percent of births unplanned[b] 1966-70	Theoretical births per woman without unwanted births
ALL WOMEN	3.0	15	44	2.7
College 4+	2.5	7	32	2.4
College 1-3	2.8	11	39	2.6
High School 4	2.8	14	44	2.6
High School 1-3	3.4	20	48	2.9
Less	3.9	31	56	3.0
WHITE WOMEN	2.9	13	42	2.6
College 4+	2.5	7	32	2.4
College 1-3	2.8	10	39	2.6
High School 4	2.8	13	42	2.6
High School 1-3	3.2	18	44	2.8
Less	3.5	25	53	2.9
BLACK WOMEN	3.7	27	61	2.9
College 4+	2.3	3	21	2.2
College 1-3	2.6	21	46	2.3
High School 4	3.3	19	62	2.8
High School 1-3	4.2	31	66	3.2
Less	5.2	55	68	3.1

Source: Commission Report, p. 97.

[a]Based on data from the 1970 National Fertility Study for currently married women under 45 years of age.

[b]Unplanned births include unwanted births.

A FEW FACTS: FERTILITY. The fertility of minority groups is higher than that of the rest of the population. Despite their higher fertility rates, however, minorities--precisely because of their smaller numbers--contribute less to population growth than does the rest of the population. The fact is that 70 percent of the annual rate of natural increase (excluding immigration) is attributable to white middle-class Americans.

Americans, regardless of their racial or ethnic backgrounds, tend to have smaller families as their education and incomes improve. As new generations move into the mainstream, their average family size decreases. For example, blacks with high school diplomas have about the same number of children as their white counterparts; college-educated blacks have fewer children, on the average, than their white counterparts.

MIGRATION. Historically, there has been a close link between a move to the city and upward social and economic mobility. But this link has broken for blacks, the Spanish-speaking, Indians, and other minority groups.

Black people who move from farm to city are better off economically than those who stay on the farm. But the better jobs and educational opportunities available in the city have not always been open to minority group members seeking them.

MORTALITY. Blacks live, on the average, seven years less than whites. This difference is due primarily to premature death among black adults between 20 and 60 years of age, and secondly to higher mortality among black children.

A Houston, Texas, case study considered by the Commission showed that in 1960, deaths among Mexican Americans were 12 percent higher for males and 67 percent higher for females than for the non-Spanish whites. Deaths among Houston's black population were higher by 43 percent for males and 87 percent for females. National figures show that total mortality among Indians is 50 percent higher than white mortality.

QUESTIONS: 1. What characteristics are being compared in the chart above? What does the chart show?

2. Which group is most likely to have the highest number of births per woman? Lowest?

3. Which group of women had the highest percent of unwanted births? Unplanned births?

4. Was there any group for which the number of unplanned births was below 25%?

5. What might happen to the population if women only had children that they wanted and planned? Do you think this would be desirable? Why or why not?

6. Why do you think some groups are more successful than others in planning pregnancies? Do you think this could be changed? How?

PURPOSE: To provide a basis for inquiry concerning factors influencing fertility.

LEVEL: Junior-senior high school.

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

NON-GROWING POPULATION

A population stops growing when the number of births has come into balance with the number of deaths. Without the effects of immigration, the size of the population would remain relatively constant. In the United States if families had, on the average, two children, we could eventually reach a non-growing population.

Of course the cessation of growth will not take place overnight. The children born during the baby boom decades form a large proportion of our population today and they are now entering the ages of marriage and child-bearing. This "built-in" growth factor means that our population will continue to increase for about 70 years.

It is important to understand the meaning of "on the average" as it relates to family size. Many people do not marry, and some who do marry either are not able to have, or do not want, children. On the other hand, a substantial number of couples have more than two children. As long as the differences balance out to two children, we can eventually have a non-growing population.

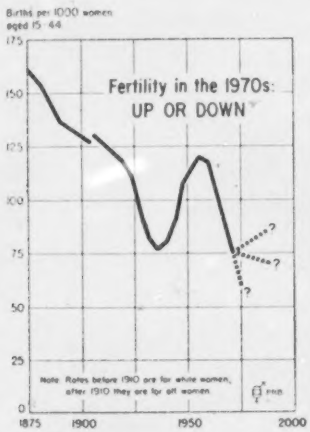
Many developments--some old and some new--would indicate that the end of population growth in the United States is possible. In 1972, fertility reached a level equivalent to a 2-child family. On the other hand, we are experiencing other trends that might prevent us from sustaining this low fertility level long enough to reach a non-growing population.

ACTIVITY: Below is a list of current factors that influence fertility in the United States. Some make a non-growing population appear likely. Others indicate that reaching a state of no growth will be a difficult and slow process.

Distribute the list to students or group participants. In discussion, ask them to make two lists: one of factors that should help us reach a non-growing population; the other a list of factors that are barriers to reaching it. Ask students to suggest those trends that appear to be the strongest forces in American society. Which are the oldest?

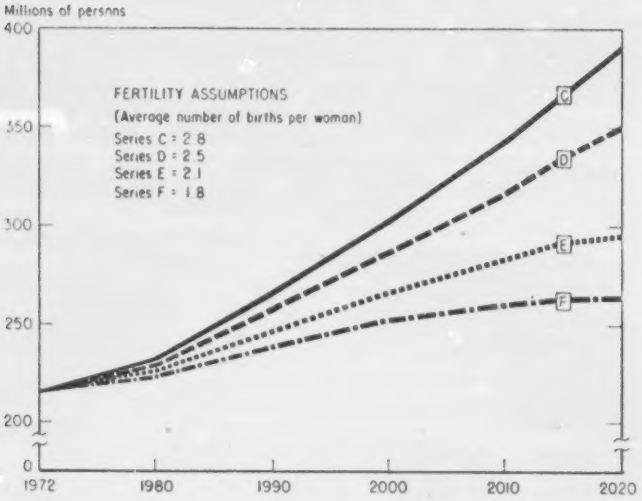
* This nation has an ideological commitment to growth.
* The technical quality of contraceptives has improved in the past 10 years.
* Youthful marriage is becoming less common.
* The role of sex in human life and of the reproductive process and its control is often poorly understood.
* In the United States in the 1930's, the response to very low fertility was anxiety over national prosperity, security, and virility.
* Concern over the effects of population growth has been increasing.
* Family life and the role of mother have been glorified in television programs.
* A prominent theme in women's magazines has been "child-saves-marriage."
* The birth rate has declined over the past ten years.
* There are restrictions on the availability of contraception, sex education, and abortion.
* The women's liberation movement is attempting to expand women's options related to work and family roles.
* During the period 1966-70, 44 percent of all births were reported as unplanned. Fifteen percent were reported as unwanted.
* The family-size preferences of young people now entering childbearing age are lower than those of the preceding generation.
* The number of women in the reproductive age groups has increased sharply and by 1980 will be even greater.

GENERAL FERTILITY RATE, 1830-1972



Source: National Center for Health Statistics

PROJECTIONS OF TOTAL POPULATION: 1972-2020



Source: U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 493, 1972.

PURPOSE: To illustrate the impact of rapid population growth upon national policy.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

ACTIVITY: The following factual situation occurred in India in 1976.

Indicate to the class that they are members of the Indian Maharashtra State Assembly, which has deferred for three months final action on a compulsory sterilization bill providing jail sentence for most unsterilized couples with three or more children.

The bill introduced recently is one of several tough sterilization laws being drawn up by the Indian state governments as part of a national effort to curb the birth rate of the 600 million people in the nation. The population continues to grow at a net figure of over one million a month and thirteen million each year.

Enactment of the bill appears assured. Prime Minister Indira Ghandi's Congress party has 211 of the 271 seats in the legislature, and only one assemblyman dissented on an initial voice vote.

Under the bill, one spouse of a couple with "the prescribed number" of children must undergo vasectomy or tubectomy operations within six months of reaching the maximum family limit allowed. The bill leaves the prescribed number to be set by the state government, but state officials have made clear the limit would be three children.

The maximum penalty under the bill would be two years' imprisonment and compulsory sterilization. Men over 55 and women over 45 would be exempt.

This is the last chance to caucus and democratically debate this bill before its final vote on the floor.

1. Break up into groups of five.

2. Choose a spokesperson and recorder.

3. Discuss the plight of India, and demographic implications of this law.

4. Reach consensus, with rationale to present to the entire Assembly.

5. Record all main points of your discussion and points where agreement could not be reached. Why could you not agree? Would more data help you? Anything else?

DATA

		United States	India
1.	Population size	200+ million	600+ million
2.	Land mass	6 x India	1/6 United States
3.	Energy usage	6% world's population; consumes 35% energy	30 Indians consume as much as 1 American
4.	Literacy	Majority of population is literate	Majority of population is illiterate and many mentally retarded due to protein deficiency

PURPOSE: To clarify values on the question of abortion through the process of role-playing and examination of key differing viewpoints.

LEVEL: Junior-senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

REFERENCE: Population and the American Future. The report of the Commission on Population Growth and The American Future.

One lesson learned by the Commissioners as they studied the matter of abortion was that sensible people could disagree over how to treat the issue. Logical arguments could support several different positions.

The Commissioners themselves disagreed over what laws should exist regarding abortion. Five Commissioners disagreed with the majority's recommendation on abortion and wrote separate statements of their views. Nineteen Commissioners felt that "the matter of abortion should be left to the conscience of the individual concerned, in consultation with her physician, and that states should be encouraged to enact affirmative statutes creating a clear and positive framework for the practice of abortion on request." The Commission admonished that abortion should not be considered a substitute for family planning, but rather as one element in a complete system of health care.

In January, 1973, the U.S. Supreme Court rendered a decision on abortion similar to the Commission majority's recommendation. This ruling specified the following:

For the first three months of pregnancy, the decision to have an abortion "must be left to the medical judgment of the pregnant woman's attending physician." For the next six months of pregnancy, a state may "regulate the abortion procedure in ways that are reasonably related to maternal health." such as licensing and regulating the persons and facilities involved. For the last ten weeks of pregnancy, any state may prohibit abortions, except where they may be necessary to preserve the life or health of the mother.

The Constitutional basis for this decision is described in the following excerpt from the Court's majority opinion:

"The Constitution does not explicitly mention any right of privacy. In a line of decisions, however,...the Court has recognized that a

right of personal privacy, or a guarantee of certain areas or zones of privacy, does exist under the Constitution...

This right of privacy, whether it be founded in the Fourteenth Amendment's concept of personal liberty and restrictions upon state action, as we feel it is, or as the District Court determined, in the Ninth Amendment's reservation of rights to the people, is broad enough to encompass a woman's decision whether or not to terminate her pregnancy..."

Despite the Court's ruling, the abortion controversy will continue. The following springboard provides the basis for understanding the complexity of the controversy surrounding the abortion issue. The arguments developed in the following four positions provide an impetus for discussion in which participants examine their own values about abortion.

ACTIVITY: Create a role-playing situation by asking four students to take and defend as forcefully as possible one of the following positions. Equal time should be given for the development of all four.

1. The first of these positions is total prohibition of abortion except in the case of a direct threat to the life of the mother. It asserts that life begins when the sperm and ovum unite and the genetic basis for a human individual comes into being. Attempts to set the beginning point of life later than formation of a one-celled zygote are arbitrary and dangerous; if there is any doubt, the benefit of the doubt should be given to the fetus. Admittedly, there are many children that are unwanted. But life cannot be made dependent upon whether or not someone, even the mother, wants the child. The child, like all individuals, has a claim to life that is all its own. To liberalize laws to permit abortion is to open the legal door for other socially unwanteds to be eliminated. A society that finds it necessary to solve the social problem of the unwanted child by sanctioning abortion is a society that threatens the very foundations of human dignity.

2. A second position is that abortions should be prohibited except where (1) the mental and physical health of the mother are endangered, (2) there is a substantial threat of a defective child being born, or (3) the pregnancy results from rape or incest. Those holding this position generally assert their concern for the dignity of human life, but contend that a total prohibition of abortion does not serve that goal. Rather, they maintain that the degradation women undergo in seeking illegal abortions, the suffering of defective children, the agony of women pregnant because of rape or incest, the unsupportable burden which many pregnancies impose upon women already in poor physical or mental health, are themselves a basic threat to the dignity of life. Those holding

this view believe the law should make provision for abortion in cases of serious stress and that these cases can be spelled out in law. In states where such statutes have been in force, a review board has usually considered whether applications for abortion fall under any of the established categories.

3. A third position is that abortion should be a matter decided by a woman and her physician up to a specified point in pregnancy--usually six months. Those holding this view believe the existence of an abortion law is important to discourage late term abortions as well as to protect the health of the woman involved. The law should allow women, their physicians and other counselors to reach the best possible judgment; a law that is too precise or tries to lay down too many conditions would be a hindrance.

4. A fourth position holds that all laws restricting access to abortion should be repealed. This position holds that repeal of abortion laws would not impose abortion on anyone; it simply recognizes the right of women to come to their own decisions in the matter. Laws that permit abortion for some reasons but not for others are as bad as total prohibition of abortion. They force women into the humiliating and degrading position of having their fate decided by others. Those supporting this position ask why the state, through its laws, should take any position on a decision so fundamentally personal as this.

These positions represent, in an oversimplified form, some of the leading arguments for and against the legalization of abortion. Not every person feels comfortable with any one of these stated positions, but in a role-playing situation these perspectives can encourage examination of key differences between pro- and anti-abortion arguments.

Individual students might find it interesting to read and react to the recent rulings on abortion made by the U.S. Supreme Court. SLIP OPINIONS are available from the U.S. Government Printing Office, Washington, D.C. 20402. No. 70-40, Doe, et. al. vs. Bolton, Attorney General of Georgia, et. al. ($.45) and No. 70-18, Roe, et. al. vs. Wade, District Attorney of Dallas County, Texas ($1.00).

QUESTIONS:

1. What are the different human "rights" argued for?
2. Whose rights are involved (mother, father, fetus, society)?
3. What values are the basis for each of the positions?
4. What values seem to be the basis for the Commission's majority recommendation on abortion?
5. Do you agree? Disagree? Why?

PURPOSE: To examine two possible U.S. growth patterns and their implications.

LEVEL: Junior-senior high school

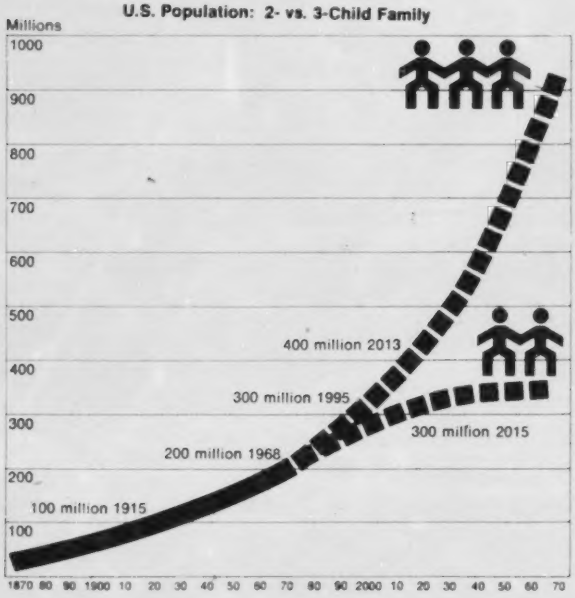
SUBJECT: Social Studies

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

ACTIVITY: Reproduce and distribute the following graph. Develop discussion around the following questions:

1. According to the graph, what was the population of the United States in 1968? What will it be in 1995?
2. In which year did (will) the U.S. reach a population of 100 million? 200 million? 300 million?
3. What will determine whether the population is greater or less than 300 million in 2010?



Source: Commission Report, p. 23
Note: Assuming small future reductions in mortality and future immigration at present levels.

PURPOSE: To compare old and new values concerning immigration policy.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to changes in immigration.

ACTIVITY: Following discussion and other exercises to provide your students with background on population, assign your students as members of Congress who must debate a bill which would reduce our annual immigrants to zero, based upon the fact that an excess of 29% of our current population growth in the United States is caused by immigration. This reduction is being proposed as an alternative to lowering natural births.

Individuals can volunteer testimony pro and con. For example, supportive testimony could be provided by advocates of population control or by those who welcome highly trained physicians, scientists, or engineers from foreign countries; negative testimony by owners of large farms in California who employ migrant workers, or by a refugee mother who came to the U.S.A. as an immigrant and raised a family in this country.

Divide your class into groups of five after testimony and class discussion to reach group consensus. They may accept, reject, or amend the bill, but should have a spokesperson to "sell" their idea to the class at the end of group discussion. Write the results and reasons on the board.

After the students discuss this issue, have them get an opinion from their parents and/or others and report back.

PURPOSE: To examine attitudes concerning the changing roles of women in American life.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to numbers and types of roles available to men and women.

ACTIVITY: Develop on the chalkboard with input from the class a list of occupations or fields of endeavor in which women are becoming more prominent. Review the change that now finds women professional athletes, women governors, senators, ambassadors, engineers, lawyers, physicians, military officers, airplane pilots, heavy machinery operators, and in many other fields of work formerly almost exclusively male.

Remind the class that only a few generations ago in America it was generally believed that "women's place was in the home". She was expected to find happiness and self-fulfillment in the role of mother-homemaker.

What factors, conditions, or attitudes have been responsible for this change? Has the change been good?

Ask each student, as a homework assignment, to review these two questions with two or three women. Urge that students interview, if possible, women who might hold different points of view.

Share findings in a subsequent class discussion. Finally, ask each student to write a paragraph or two in which he or she evaluates the benefit (or harm) to women, family, and country of "getting women out of the home".

PURPOSE: To examine relationships between population growth, industrialization, and unemployment.

LEVEL: Junior-senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to national economy.

ACTIVITY: Engage the class in citing examples of how the industrial revolution and the increasing use of energy resources and electricity has reduced the need for people to do the world's work. From 1910 to 1972, for example, the number of persons working on American farms fell from more than 13,000,000 to less than 4,500,000; a reduction of about 67%. And during this time American production of food and fiber increased.

Automated machinery in the steel industry, in automobile assembly plants, in food processing, and in many other places has also reduced the need for workers while increasing productivity.

As population grows and production of goods becomes more mechanized unemployment of sizeable portions of our population appears to be inevitable. This conclusion, reached by some persons, is rejected vehemently by others.

Ask students to interview two or three adults to ascertain their beliefs concerning the truth or untruth of the statement. What suggestions do the persons interviewed have to reduce unemployment? Do any of them suggest the desirability of a slower-growing or smaller population?

Discuss the findings obtained in the interviews in the class in an effort to delineate areas of consensus and disagreement.

PURPOSE: To examine population pressure problems on the United States-Mexico border.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

REFERENCE: 1975 World Population Data Sheet, Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, D.C. 20036

ACTIVITY: While there is worldwide concern about population growth within countries there is heightened concern at the points of international boundaries such as between Mexico and the United States.

Present to the class data such as the following taken from the reference cited above. Special attention should be given to the present huge differences in per capita GNP and to the bleak prospects for a Mexico growing at its present rate. The data suggest why many Mexican laborers or families are eager to enter the United States, legally if possible, but illegally if necessary. The situation is affected also by the fact that many truck farmers in Southern California, Arizona, and Texas are eager to get cheap hand labor to harvest the crops.

Ask six students in the class to play the role of a Mexican family planning to enter the U.S.A. illegally. Ask that they prepare the arguments they will use with a Texas fruit grower who has a reputation for hiring "wetbacks" who come from Mexico illegally.

Ask three other students to represent the United States Immigration Service and explain to the Mexican family why they cannot and should not be permitted to stay in the United States.

Ask the remainder of the class to analyze the arguments used by each group. Where did they touch on the same issues? Where did they start from different premises? Which arguments were most persuasive?

Is the problem of illegal immigration across the Mexico-United States border likely to get worse or better? What, if anything, can be done about it?

	United States*	Mexico*
Population (1975)	215 million	59 million
Rate of population growth (annual percent)	0.9	3.2
Number of years to double population	77	22
Population projection to 2000	265 million	132 million
Per Capita Gross National Product	$5,590	$740

*All data taken from 1975 World Population Data Sheet.

PURPOSE: To explore the governmental intervention involving birth control.

LEVEL: Senior high school

SUBJECT: Social Studies
Home Economics

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: Reprinted from OPTIONS with permission of the Population Reference Bureau.

HUMAN REPRODUCTION

Responsible parenthood means that parents have some understanding of the implication of their reproductive decisions for themselves and their children. While the benefits and rewards of children are well known, many people fail to recognize the emotional and financial costs involved. For example, direct costs cover raising a child from birth through high school or college. In addition to these direct costs, one parent - usually the woman - will tend to spend more time at home, thus giving up an income which she might otherwise have earned.

Information on the costs to the family of raising a child is an important part of education for parenthood. With some idea of the financial demands of children, parents can plan ahead and be better prepared to provide the kind of life they want for their children.

Yet other costs are involved when couples have children before they want them. Recent research has shown a high level of unplanned pregnancies and unwanted births in the United States. According to estimates of the Office of Population Research at Princeton University, which conducted the 1970 National Fertility Study, 44 percent of all births to currently married women during the five years between 1966 and 1970 were unplanned; 15 percent were reported by the parents as having never been wanted. Theoretically this many unwanted births suggests that 2.65 million of the births occurring in those five years would not have occurred had perfect fertility control been available.

The costs of such a high incidence of unplanned reproduction are many--financial, social, psychological, and health. Family budgets may be seriously strained by an unexpected birth. Those families who can least afford this kind of burden most often face it.

ACTIVITY: More than half the states have laws that prohibit or restrict the sale, distribution, advertising, and display of contraceptives. The Commission on Population Growth and the American Future found, for example, that 22 states prohibit commercial advertising and display of contraceptives or information about them.

It is difficult to interpret these anti-birth control laws because enforcement is uneven; and in some states, court decisions have changed the letter of the law.

To give students a better idea of what impediments actually exist in their own state and community, suggest an inventory. Ask students to investigate the following:

1. The statutes in their state that limit access to contraceptive information, procedures, and supplies.

2. Attempts to change the laws or circumvent them. (For example, do college health services provide birth control services to minors despite state laws? With what consequences?)

Resources for research on this question could be the law sections of various libraries, neighborhood pharmacists, physicians, and local agencies such as Planned Parenthood and Zero Population Growth chapters.

PURPOSE: To clarify values concerning child-bearing attitudes.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

ACTIVITY: Indicate to the class that they comprise a group that has been brought together to debate a U.S. Congressional proposal to stabilize the U.S. population. One of the first aspects of implementing the proposal will be to remove tax deductions for children numbering over two per family.

Assign students or have them volunteer for one of the roles suggested below. Urge that students try seriously to identify with the role they represent. Allow five to ten minutes for students to prepare a strong justification for their attitude regarding family size. Have spokespersons for each role present their arguments and defend them against arguments from other students who hold other beliefs. In essence students will be challenging the positions and underlying values of others with whom they disagree.

If time and interest permit, the activity might be continued with students exchanging roles.

a. You are a poor ghetto woman. Having babies produces the only thing you have to live for; the only thing you can call your own is your baby (babies, as you have 9 children). Or you are a ghetto male, scarcely ever really staying at home to fulfill the role of father to the 9 children you have fathered to your wife. Each time your "wife" becomes pregnant, it is a sign of greater virility for you.

b. You are a university professor, very concerned about population, and you therefore plan to have one child, but probably none, and contribute to society in other ways. In fact, you believe in negative growth.

c. You are an average young college student, married or unmarried. You are very concerned about the environmental crisis, and feel every couple should limit their family size to two children to achieve zero population growth.

d. You are a wealthy developer. You buy up large and cheap parcels of land, particularly when back taxes cannot be

paid, and build cheap small houses with small yards on the former agricultural land or woodland. You live in a luxurious home with 15 open, lovely acres surrounding it. You feel that you are serving an important segment of America by building and providing "homes for a growing America." You very certainly believe in positive population growth and a spiraling GNP. You believe you should have a large family if you can afford it.

e. You are an ultra-conservative Irish Catholic. Your religion as you understand it urges you to consider family size an individual choice. You are, in fact, doing your duty to God by bearing a large family, and you certainly don't believe in birth control unless it is abstinence or rhythm. You have some problems with your sex life, and have also become pregnant nearly every year for the first six years of marriage. Or, you are the husband in such a family, and believe as does your wife. You also belong to the Chamber of Commerce which is encouraging "Growth" for the benefit of the future of your average-sized town. You feel that young "liberal" Catholics are disloyal to your religion.

f. You are a 25-year old college-educated black woman who wants to continue your successful career. You do not want any children after struggling several years to achieve your present level of success.

g. You are a black militant who feels..."population control is genocide."

PURPOSE: To consider the complex nature of population education questions.

LEVEL: Senior high School

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: The Population Challenge - What It Means to America. United States Department of the Interior Conservation Yearbook No. 2.

ACTIVITY: Present to the class the following statement made by President Lyndon B. Johnson in a United Nations speech on June 25, 1965:

"Let us in all our lands ... including this land ... face forthrightly the multiplying problems of our multiplying populations and seek the answers to this most profound challenge to the future of all the world. Let us act on the fact that five dollars invested in population control is worth one hundred dollars invested in economic growth."

In general discussion identify several discrete elements inherent in the statement such as (1) examples of the world's multiplying problems, (2) examples of the world's multiplying populations, (3) alternative suggested answers to these problems, and (4) the idea that investing money in population control may be a wise strategy.

Ask students to select one of the four elements and do library or homework research to collect data and/or judgments to bring back to the class for subsequent discussion. Ask the class to consider, also, whether the problem stated by President Johnson in 1965 is now more or less severe than it was then. Why? Why is this problem so difficult to deal with?

PURPOSE: To demonstrate "carrying capacity" and "limits to growth".

LEVEL: Senior high school

SUBJECT: Science

CONCEPT: Carrying capacity caused by the interaction of population growth resources and technology is reached and often exceeded whenever pollution is indicated.

ACTIVITY: Drosophila melanogaster, the common fruitfly, is used in this activity due to ease in handling and rapid breeding. A generation is approximately fourteen days at room temperature. An average female may lay up to 500 eggs in 10 days. The fruitfly goes through four distinct stages in fourteen days: Egg (one day), larva (seven days), pupa (six days), adult.

Students should practice with equipment before beginning the experiment to achieve manual dexterity. Equipment needed?

1. Several narrow-mouth clean jars or vials of equal size
2. Sterile cotton
3. Stiff brown paper
4. Ether for anesthesia
5. Camel hair brush
6. Magnifying glass or dissecting (scanning) microscope
7. Corn meal, molasses, water, and yeast (or prepared media)
8. 2 male and 2 female fruitflies (ordered from supply company or attracted with overly ripe fruit--tomatoes or bananas)

Fill one jar for each count to be made with about one inch of prepared media or thick gruel or corn meal, molasses, and water, sprinkled with a little yeast. Insert a long, coiled piece of stiff, non-absorbent paper with rough texture for larva to pupate onto. Insert flies and stopper with cotton. Each day, count flies by tapping them gently into a clean jar or anesthetizer held mouth to mouth with culture jar, with bottom toward a strong light source to attract flies into jar. Once flies have entered, quickly stopper with cotton soaked in ether, or allow anesthetizer to work for 60 seconds or until flies stop moving. DO NOT OVER-ETHERIZE, AS THIS WILL KILL FLIES. Do not etherize culture jar directly, as larva and pupa die more quickly than adults. Quickly count population. Make cumulative tallies each day, returning anesthetized flies to original culture bottle. When did the population reach equilibrium or carrying capacity? Why? When did the population die out? Why?

NOTE: Males may be identified by slender black abdomen and females by broad striped abdomen.

If equipment is not available, it may be ordered from:

Carolina Biological Supply Company
Burlington, North Carolina 27215
or
Gladstone, Oregon 97027

PURPOSE: To examine the influence of population growth on attitudes toward gun control in the United States.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to individual and group expectation and conflict.

ACTIVITY: Engage the class in a review of the importance of firearms in the growth of the United States. Students will (should) recall from previous studies, motion pictures, and television the need for rifles to secure food, to protect pioneer homesteads in colonial times, to subdue Indians, to establish "law and order" in the West, and similar uses.

Indicate to the class that guns (shootings) are, according to FBI reports, the principal agent for murder in use today in the United States. Indicate, also, that murder by shooting is a much larger problem in the United States than it is in any other western civilization country.

Indicate that F.B.I. data shows that violent crime (very often gun-related) is found to be highest on a per capita basis in large cities such as New York, Baltimore, Los Angeles, Detroit, and Chicago.

Suggest to the class the possibility that the individual right to own guns, particularly revolvers, might need to be curtailed as the country changes from a raw frontier to a densely populated urbanized America.

Ask for volunteers (4 or 5) to examine seriously each side of this very controversial issue. Suggest that the volunteers contact persons active in the National Rifle Association, policemen, and others who are known to have strong views on this issue. Suggest, also, that some of the oldest persons in the community be interviewed to see if they sense a changing attitude toward guns and gun control.

As a final aspect of the activity ask the students who have studied the two sides of this question to report their conclusions to the class and to lead the follow-up discussion. Finally ask each class member to vote as to whether he favors no, limited, or strict gun control.

PURPOSE: To examine population planning in the world's most populous country.

LEVEL: Senior high school

SUBJECT: Social Studies
Science

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: Population and Family Planning in the People's Republic of China. The Victor-Bostrom Fund Committee and the Population Crisis Committee, 1730 K St., N. W., Washington, D.C. 20006.

ACTIVITY: Review with the class the enormous population of the People's Republic of China, estimated by the U.S. Census Bureau to be approximately 900,000,000 in 1975. This population, roughly four times that of the United States, lives in an area very slightly larger than the United States. While the United States has six cities with populations exceeding one million, Mainland China has 13 such cities including Shanghai with a population of more than 11 million.

Problems associated with population growth, particularly adequate food supplies, medical care and educational opportunities have been of great concern to China's leaders in recent years. The status of family planning (and population control) in China was reported in the following letter written by a highly respected journalist a few years ago.

After reading the "Letter from Peking" ask the class to react to what is being done in that country. Is it "good" or "bad"? Why? Would anything being done in China regarding family planning be promising to try in the United States? Why or why not?

Letter from Peking

中國

William H. Draper Jr.
Population Crisis Committee
Washington, D.C.

Peking, China
January 14, 1971

Dear Mr. Draper:

Family planning has been legalized and advocated by political, social and medical authorities in China with varying degrees of emphasis for about 15 years. . . .

Developments within the past two or three years have been fairly dramatic. Chinese research laboratories experimented with various formulae for an effective pill, but did not find a completely satisfactory one until 1967. The present pill is now manufactured in the billions, in the largest chain of labs of this nature in the world.

The pill is taken for 20 to 22 days a month. It is said to have no side effects and to be acceptable for 98% of those tested. In certain cases the ring is preferred. The latter was in most widespread use before the perfection of the pill but is now less and less in demand.

Another pill, now in use in regional control centers, also appears to be 100% effective for those who have applied it to date--a period of more than a year--but has not yet been nationally approved. It is a once-a-month pill.

In our travels my wife and I found family planning in practice among women in factories, institutes, neighborhood communities in cities, and communes in the countryside down to the village level. Clinics in the communes supply propaganda and materials. At the brigade (village) level medical workers who have been trained at commune or country hospitals to carry out vaccination, first aid, and other treatment (including acupuncture) are qualified to distribute the pill. All medical attention in the communes is paid for out of the welfare fund and the same applies to women factory employees (and men). Members of families who are not themselves workers but whose parents or husbands or wives work receive medical and hospital attention at half rates (very low). The pill is everywhere distributed free of charge.

Abortion is legal and given to the pregnant woman free of charge, if a worker, and for a small fee--two yen--if not. The method up to 2½ months is by vacuum removal.

Sincerely,

Edgar Snow

PURPOSE: To become aware of forces that change population patterns.

LEVEL: Senior high school

SUBJECT: Social Studies

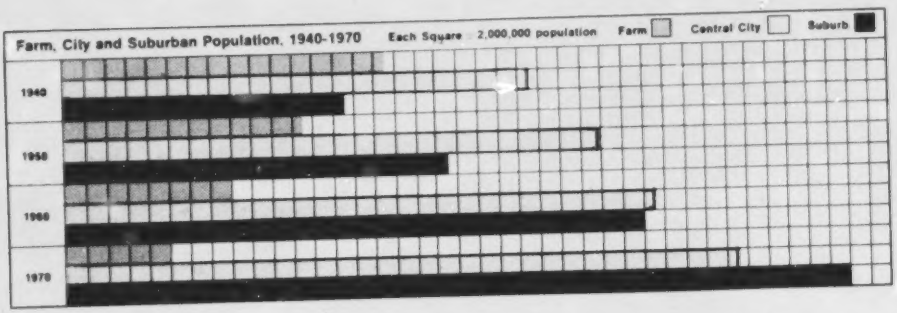
CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to geographic dislocations.

REFERENCE: Population and the American Future. Report of the Commission on Population Growth and the American Future, 1972.

ACTIVITY: Review with the class data such as that shown below that illustrates the shifting nature of the American population between 1940 and 1970. Note the steady growth in central cities, the much larger growth in suburban population, and the precipitous decline in farm population during that thirty-year period.

Divide the class into groups of three students. Ask each group to (1) list reasons they can think of to account for the gains in city and suburban population and the decline of farm population, (2) list problems they can identify that are associated with these changing population patterns, and (3) list suggestions as to how the problems can be reduced or minimized.

Pool the group-prepared lists into a master list and engage the class in searching for consensus. Do the problems appear to be solvable through education? Through legislation? Through other means?



PURPOSE: To examine arguments for and against "growth economy" and "stabilized economy".

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Carrying capacity caused by the interaction of population growth resources and technology is reached and often exceeded whenever pollution is indicated.

ACTIVITY: Historically the United States has had a "growth economy". Increases in the Gross National Product such as those cited below are related to two factors: (1) increase in goods and services produced and consumed in the country, and (2) increase in the total population of the country. New homes must be build for more new families starting housekeeping, more people need more automobiles, more children require more schools, and so forth.

Chambers of Commerce and other groups often argue that cities and our economy generally must "grow or die". Other groups, however, argue that growth for growth's sake is foolish. They say that uncontrolled growth of suburbs accompanied by intensive use of the private automobile for transportation has resulted in horrendous metropolitan problems.

Divide the class into two groups. Ask one to marshall arguments from reading, interviews and similar sources for an expanding growth economy. Ask the other to develop the counter-arguments for a stable growth economy. Ask each group to select two or three persons to present its arguments to the class. After total class discussion on the alternatives ask each student to indicate whether he believes the U.S.A. should continue in the growth tradition or should attempt to move to a more stabilized condition.

Growth in Gross National Product in U.S.A.*

Year	Millions of Dollars
1950	285,000**
1960	504,000
1970	977,000
1972	1,155,000

*Source: The World Almanac, 1974.

**All amounts rounded to nearest billion dollars.

PURPOSE: To understand forces affecting demographic transition.

LEVEL: Senior high school

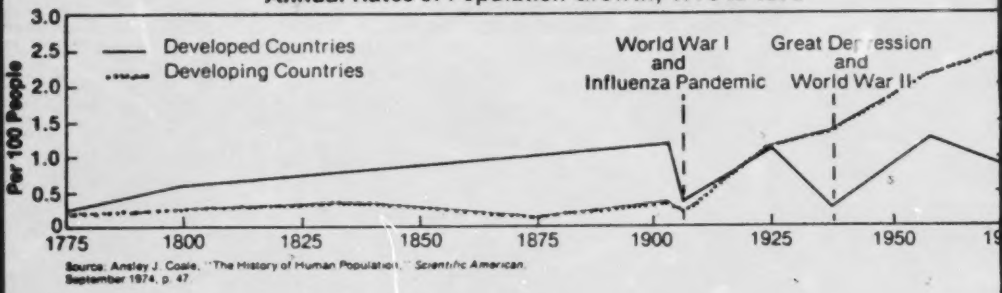
SUBJECT: Social Studies

CONCEPT: The rate of population growth differs significantly between developed and less-developed countries.

REFERENCE: Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036.

ACTIVITY: Present to the class by means of an overhead transparency or on a worksheet the chart shown below that traces rates of population growth for developed and developing countries from 1776 to 1975. Engage the class in identifying developed countries (U.S.A., Western Europe, Japan and others) and developing countries (India, Nigeria, Bolivia and others). Note the major factors that lowered, temporarily, the growth rate in developed countries.

Annual Rates of Population Growth, 1775 to 1975



Source: Ansley J. Coale, "The History of Human Population," *Scientific American*, September 1974, p. 47.

Present to the class in study guide or lecture form the following material quoted from the reference cited above:

> "Demographers refer to the gradual shift of birth and death rates from high to low levels as the demographic transition. This demographic transition has tended to follow a pattern with three distinct stages. During the first stage death rates fall from relatively high levels due to the introduction of modern medical practices and improved sanitation. The second stage is characterized by high birth rates and relatively low death rates; this is a period of very rapid population growth. The third stage of the transition

process occurs when fertility decreases to close the gap between birth and death rates, resulting in slower rates of population growth.

In the developing nations of Asia, Africa, and Latin America, the demographic transition has not yet been duplicated. Effective public health and sanitation measures have decreased mortality in most of the developing nations. Despite widespread poverty and backward living conditions, mortality has, in fact, dropped much more abruptly than it did in the developed nations. However, there has yet been no significant decline in fertility. The result is a rapid increase in population in the developing countries.

The chart above shows the different population histories of the developed and developing nations. From the late 1700's until after World War I, the growth rate in the developed nations exceeded that of the developing ones. However, since the 1920's growth in developing regions has predominated with the gap widening significantly after 1950.

Attaining lower levels of fertility appears to be closely associated with a country's degree of development. Attitudes about family size change slowly as a country becomes more urbanized and industrialized. The traditional role of the family as the center of employment, economic security, education, and recreation is altered drastically in urban areas. Increasing costs of feeding and educating children, as well as changing attitudes toward work and the education of both men and women, seem to foster attitudes more favorable to small families. Because of the long-term nature of these changes, the developing nations will be saddled with rapid population growth for an extended period--at least until the overall level of development improves radically."

Ask each student to write a personal reaction to questions such as (1) what, if anything, can or should the developing countries do to accelerate their level of development and (2) what, if any, is the responsibility of the developed ones?

Discuss and evaluate the student ideas.

PURPOSE: To examine forces affecting immigration into the United States.

LEVEL: Senior high school

SUBJECT: Social Studies

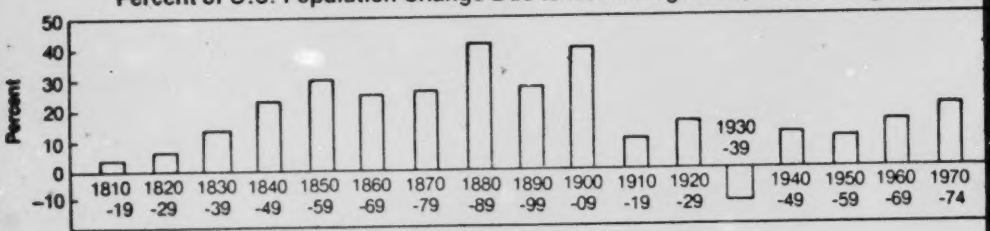
CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to changes in immigration.

REFERENCE: Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036

ACTIVITY: Present to the class by means of an overhead transparency or on a worksheet the chart shown below that indicates U.S. population change due to immigration. Engage the class in identifying the decades of greatest immigration. Ask students to speculate or explain out of their previous learning why immigration was smaller in the decades of 1860 and 1870 than in 1850. Involve students in understanding how the U.S. could accommodate the tremendous numbers of immigrants during the period 1880-1910. Are these work opportunities still available? Why or why not?

The U.S. still has one of the most liberal immigration policies in the world. Is this a good idea? Why or why not?

Percent of U.S. Population Change Due to Net Immigration, 1810 through 1974



Sources: Irene Taeuber and Conrad Taeuber, *People of the United States in the 20th Century*, U.S. Bureau of the Census, 1971, p. 582; *Population Estimates and Projections*, Series P-25, No. 545, U.S. Bureau of the Census, 1975.

PURPOSE: To examine population differences among selected countries.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to health.

ACTIVITY: Distribute to the class data such as that cited below that shows population density, growth rate, and life expectancy is short in six countries. Ask the other half to do similar research to determine why life expectancy is much longer in six other countries.

The following day ask each group to present its conclusions to the class. In follow-up class discussion consider the apparent non-relationship between the factors of population density - growth rate - and life expectancy as shown for twelve countries. What factors do the short life expectancy countries have in common? What factors are common in the other countries? Is life expectancy related in any way to growth rate? Why or why not?

National Population Density, Growth Rate and Life Expectancy in Selected Countries*

Country	Density(1)	Growth Rate(2)	Life Expectancy(3)
Chad	3	2.3	34
Mali	4	2.1	37.2
Ethiopia	21	1.8	38.5
Senegal	21	2.4	41
Tanzia	14	2.6	41
India	168	2.2	48.4
Sweden	18	0.8	71.9
Norway	12	0.8	71.4
U.S.A.	22	1.1	71.2
Denmark	115	0.7	71
Netherlands	323	1.2	70.8
Bulgaria	77	0.7	70.3

(1) persons per square kilometer
(2) percent annual rate of increase 1963-71
(3) typically for males at age one

*Source: United Nations Demographic Yearbook, 1971, Cited in The World Almanac, 1974.

PURPOSE: To develop awareness of population phenomena through use of research techniques.

LEVEL: Senior high school

SUBJECT: Social Studies
Science
Language Arts

CONCEPT: Knowledge and skills necessary to evaluate the impact of population changes are necessary for the citizenry, including understanding demographic terms and phenomena.

REFERENCE: Teaching Population Concepts by Pat King and John Landahl for the Office of the Superintendent for Public Instruction, Olympia, Washington, 1973. p. 45. (Activity suggested by Kathy Van Blaricom.)

ACTIVITY: Group research on population topics can be an excellent learning activity for older students. Your class can be divided into four groups. Each group should have a main topic for discussion. Suggested items under each topic heading will help students develop the topic. Students can seek out information from school and local libraries. Periodicals are particularly helpful. Each student can have a group assignment and an individual assignment. For example:

Group assignment:

(1) By using the resources available in the school and public library, periodicals and newspapers, obtain facts for your presentation. Suggested items related to your topic should help you get started.

(2) Relate your topic to different countries as well as the United States and your own city.

(3) Your group will be required to present an oral talk with each member taking part; or your presentation may be in the form of a panel discussion.

(4) Your group should be prepared to end with a question and answer period.

Individual assignment: Prepare a paper which covers the following points:

(1) List all the sources that you used.

(2) Make a list of exactly what you did in the group project.

(3) Make a list of what you think were the main ideas and facts dealt with by your group.

The following are some suggested topics for group research:

GROUP ONE--What Factors Act to Limit Population Growth?

Consider the following:

(a) immigration and emigration
(b) industrialized countries versus developing countries
(c) social mores (marriage, customs, religion, etc.)
(d) disasters and wars
(e) medical advances

GROUP TWO--What Factors Act to Increase Populations?

Consider the following:

(a) immigration and emigration
(b) industrialization
(c) social mores and customs
(d) affluence
(e) medical advances (innoculation, sanitation, etc.)
(f) baby booms

GROUP THREE--What Are the Results of Overpopulation?

Consider the following:

(a) environment
(b) psychological results
(c) style of living changes; quality of life
(d) physiological results
(e) population that continues to grow at its present rate

GROUP FOUR--What Must and Can Be Done to Stop Overpopulation?

Consider the following:

(a) individual level attitude changes
(b) local level changes (education)
(c) United States and the rest of the world
(d) voluntary versus involuntary measures

PURPOSE: To assist students in clarifying values in support of or opposed to national population growth.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

REFERENCE: Population and the American Future. The Report of the Commission on Population Growth and the American Future.

Within the last half century Japan, England and Wales, France, Denmark, Norway, West Germany, Hungary, Sweden, and Switzerland have all experienced periods of replacement level fertility lasting a decade or more. And today some countries approaching non-growing populations are concerned about possible labor shortages.

Greece is one nation now implementing a policy to increase her population size. This policy, described in the article below, takes the form of a "baby bonus". In marked contrast to this are the kinds of policy goals recommended for the United States by the Commission.

ACTIVITY: Use the article, the excerpt from the Commission Report, and the listed questions as springboards for comparing diverse population policies, and the different values on which these policies are based.

Students should be encouraged to explore the consequences of each policy for the country in which it is to be implemented; and to examine the implications the two policies could have on other countries. The students should then be encouraged to take a position for or against the proposed policies. Students should also take positions concerning the role of governments in providing incentives for population increases or decreases.

GREECE OFFERS BABY BONUS
TO OFFSET POPULATION DIP*

ATHENS--Greece is offering bonuses to families having more than three children as a means of increasing her population.

Concerned that she may end up a nation of stagnant, if not declining population, Greece has decided to give a monthly bonus of $17 for each child born to couples in excess of three. The Greek population, it is noted, is going up about half the rate of the average of the rest of the world.

Soterios Agapitides, deputy economic minister, notes that the social evolution is out-distancing the economic progress of the nation. In Greece as elsewhere, the rural population is moving into the cities.

Architects and city planners have tried to cram as many people as possible into as small a space as possible. Clusters of apartment dwellings have appeared in the major cities. The average blue- or white-collar worker can afford only a two or three room flat--just large enough for one or two children.

Although illegal, abortions are relatively inexpensive and easy to obtain.

Emigration is another factor keeping the population down to 8.6 million.

Decades of economic paucity have led many poor Greeks to move abroad. In the decade 1960-69 the manpower drain reached well over 1.7 million. Most head for West Germany, the United States, or Australia.

The majority of migrants are in the 20-30 age group.

Officials believe that the baby bonus plan will help alleviate the problem, but the results will not be evident for years.

*Reprinted with permission from THE HELLENIC CHRONICLE, Boston, Mass.

POLICY GOALS (Excerpt from the Commission Report, p. 78)

In the broadest sense, the goals of the population policies we recommend aim at creating social conditions wherein the desired values of individuals, families, and communities can be realized; equalizing social and economic opportunities for women and members of disadvantaged minorities; and enhancing the potential for improving the quality of life.

At the educational level, we wish to increase public awareness and understanding of the implications of population change and simultaneously further our knowledge of the causes and consequences of population change.

In regard to childbearing and child-rearing, the goals of our recommendations are to: (1) maximize information and knowledge about human reproduction and its implications for the family; (2) improve the quality of the setting in which children are raised; (3) neutralize insofar as it is practicable and consistent with other values those legal, social, and institutional pressures that historically have been mainly

pronatalist in character; and (4) enable individuals to avoid unwanted childbearing, thereby enhancing their ability to realize their preferences. These particular policies are aimed at facilitating the social, economic, and legal conditions within our society which increase ethical responsibility and the opportunity for unbiased choice in human reproduction and child-rearing. At the same time, by enhancing the individual's opportunity to make a real choice between having few children and having many, between parenthood and childlessness, and between marriage and the single state, these policies together will undoubtedly slow our rate of population growth and accelerate the advent of population stabilization.

In connection with the geographic distribution of population, our objectives are to ease and guide the process of population movement, to facilitate planning for the accommodation of movements, and to increase the freedom of choice in residential locations.

QUESTIONS:

1. What are some of the factors that are leading to a population decline in Greece? What else can you find out about the population in Greece?

2. What position does the Greek government take toward non-growth? What words or phrases in the article make you think this? Why do you think the Greek government made a policy like this one?

3. Do you think this is a good policy? Why or why not?

4. What are the implications of the Greek policy for another country? For the world?

5. Do you think that governments should make a policy about family size? Why or why not?

6. Do you feel that a non-growing population is a legitimate goal for the United States? For other industrialized countries? For developing countries?

7. What means are available to a country to attain a non-growing population? Which of these do you feel should be used in the United States? Which of these are recommended by the Commission for the United States?

PURPOSE: To examine the relationship of available tillable land to death rate in a populous country.

LEVEL: Senior high school

SUBJECT: Social Studies
Science

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to resource demand and depletion.

REFERENCE: World Population Trends: Signs of Hope, Signs of Stress. Lester R. Brown. Worldwatch Institute, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036. $2.00.

ACTIVITY: Reveiw with the class the fundamental fact that most of the world's food supply comes from tillable land. Review also the fact that productive agricultural land is severely limited in countries such as Bangladesh with a population of more than 75 million living in an area of 55,000 square miles (only slightly larger than Florida).

Landowners, even those with small holdings, are in a position to produce some or much of the foodstuff needed to prevent starvation or debilitating illness in their families as is shown in the table cited below.

Engage the class in analyzing differential death rates of families that owned no land or the small amounts shown in the table. Why are land holdings so small? What, if anything, can be done to improve the situation? Is it possible or likely that the condition present in Bangladesh will develop in other countries? What can/should be done to reduce the likelihood? Can/should the United States or some other political agency concern itself with such a problem?

Death Rate in 1975 by Size of Landholdings
Companiganj, Bangladesh

Size of Land Holding (Acres)	Death Rate (per 1,000)
None	35.8
.01 - .49	28.4
.50 - 2.99	21.5
3.00+	12.2

Source: The Johns Hopkins University School of Hygiene and Public Health, preliminary data.

PURPOSE: To examine arguments in favor of and opposed to abortion as a population control policy.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Personal and collective decisions and actions can change the size and character of populations as related to fertility planning/birth control.

ACTIVITY: Abortion as a means of controlling family size is a rapidly growing practice throughout the world. The practice is legal and available at very low or no cost to women in Japan, China, India and several other countries. The United States Supreme Court in 1973 "overruled all state laws that restrict or prohibit a woman's right to an abortion during the first 3 months of pregnancy."

The question of abortion is an extremely emotional issue. Some groups object violently to the practice on religious, ethical, or moral grounds. Other groups are equally strong in their belief that the practice can be justified.

Ask for 3-5 students to do research and summarize the arguments opposing abortion while a similar group prepare the opposite point of view. Ask the groups to report to the class. In follow-up discussion consider questions such as the right, if any, of the father to be involved in a woman's decision to terminate a pregnancy.

PURPOSE: To overview many dimensions of the population problem.

LEVEL: Senior high schoo

SUBJECT: Science
Social Studies

CONCEPT: Population changes in the United States and other nations affect the individual and society as related to many factors.

REFERENCE: Twenty-Two Dimensions of the Population Problem. Lester R. Brown, Patricia L. McGrath, Bruce Stokes. Worldwatch Paper #5, 1976. Worldwatch Institute, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036, $2.00. Class use orders of 20 or more $1.25 each.

ACTIVITY: The teachers should, if possible, secure and read a copy of this 80-page booklet which points out how population growth and other aspects of human development are directly linked.

Present to the class the general idea advanced by the authors that relationships exist between population growth, particularly the very rapid growth now present in many countries, and the following world-wide concerns:

1. Literacy
2. Oceanic Fisheries
3. Natural Recreation Areas
4. Pollution
5. Inflation
6. Environmental Illness
7. Hunger
8. Housing
9. Climate Change
10. Overgrazing
11. Crowding
12. Income
13. Urbanization
14. Deforestation
15. Political Conflict
16. Minerals
17. Health Services
18. Water
19. Unemployment
20. Endangered Species
21. Energy
22. Individual Freedom

Ask students individually or in groups of two or three to select one of these concerns and do library research and/or interviews with knowledgeable persons to find out how these areas of concern are affected negatively by population growth.

Ask students to develop a short paper summarizing their findings. Ask students, also, to make recommendations about what can or should be done about the area of concern they have studied.

PURPOSE: To consider moral issues involved in providing food to starving populations.

LEVEL: Senior high school

SUBJECT: Social Studies

CONCEPT: Struggles of many families and nations to develop economically are prolonged and made more difficult by rapid population growth.

ACTIVITY: Review with the class the historical fact that famine was, in earlier times, an effective population control mechanism. Prior to the development of modern communication and transportation systems millions of persons died from starvation in countries such as China and India without receiving substantial help from other countries.

Today through the help of agencies such as the United Nations, the United States Agency for International Development, and religious groups, food is quickly sent to areas where starvation threatens. Children who, in earlier times would have starved to death, are kept alive. Subsequently they marry, have children, and add to the population explosion.

Some persons have argued that the United States government should not send food to any country unable to feed itself unless that country undertakes serious measures to limit its population growth.

Engage the class in discussing the two sides of this position. As a part of the discussion invite religious leaders (priest, minister, rabbi) and, if possible, a spokesman from the United Nations to come into the classroom to present their ideas on this subject.

BASIC GLOSSARY

AGE-SEX PYRAMID - a horizontal bar graph comparing the proportions of males and females in different age groups in the population.

DEMOGRAPHIC TRANSITION - a theory of population change from high death rates and high birth rates to low death rates and low birth rates. During the period of transition there is rapid population increase due to lower death rates preceding the lowering birth rates.

DEMOGRAPHY - the statistical study of populations dealing primarily with vital statistics such as births, deaths, marriages, and population distribution.

FERTILITY RATE - the number of births per 1000 women in the 15-44 age group.

GROWTH RATE - the percentage of increase or decrease of a population. It is the number of births minus the number of deaths per 1000 population, ± net migration, expressed as a percentage.

NATURAL CONTROLS - those natural forces which operate to keep populations in check. These include famine, disease, plagues, pestilence, and environmental changes.

PRO-NATALIST - refers to cultural attitudes and values which favor motherhood and large families.

PROJECTION - an assumption or estimate of what a population will number at some future date based on present trends. It is NOT a prediction. If conditions change, the projections remain technically correct even though they prove to be inaccurate.

REPLACEMENT LEVEL OF FERTILITY - a completed fertility rate of 2.11 wherein there will be just enough births to replace the parents and compensate for premature deaths, assuming proper age structure and no net effect of migration.

ZERO POPULATION GROWTH (ZPG) - the stabilization of a country's growth rate at 0.0%. This occurs when birth rates and death rates are equal, assuming no net effect of migration.

PRE-POST TEST ON POPULATION
(Measure the impact of your Pop Ed teaching)
(Students might also survey family and community)

Part I: FACTUAL TEST

____ 1. What is the size of the world population today?
a. 900 million
b. 2.2 million
c. 4.0 billion
d. 7.4 billion
e. 2.2 billion

____ 2. What is the present rate of growth of world population?
a. 1%
b. 2%
c. 5%
d. 10%

____ 3. If world population continues its present rate of growth, how long will it take to double?
a. 10 years or less
b. about 20 years
c. about 35 years
d. about 95 years
e. about 120 years

____ 4. What is the population size of the United States today?
a. under 50 million
b. about 75 million
c. about 110 million
d. about 215 million
e. over 500 million

____ 5. If the U.S. population continues to grow at its present rate, how long will it take to double?
a. 10 years or less
b. about 25 years
c. about 35 years
d. about 95 years
e. about 120 years

____ 6. (T or F) In reference to the current U.S. population, a replacement level of 2.1 average number of children means a zero rate of growth.

____ 7. (T or F) We have now (in 1977) reached zero population growth.

____ 8. (T or F) Once replacement fertility level is reached, a population will have stabilized.

_____ 9. Which of the following has the greatest number of people?
a. China
b. India
c. Europe
d. North America
e. Latin America

_____ 10. Which region has the fastest growing population in the world today?
a. U.S.S.R.
b. Europe
c. Latin America
d. Africa
e. Asia

_____ 11. What percentage of U.S. population growth is due to immigration?
a. 1%
b. 5%
c. 12%
d. 18%
e. 29%

_____ 12. Which of the following has NOT been a major cause of the population explosion?
a. lower infant mortality
b. longer life span
c. improved sanitation
d. increase in birth rates
e. modern preventive medicine

_____ 13. In the "Have-Not" or developing nations, which of the following is true?
a. birth rates are high
b. death rates are high
c. literacy rates are high
d. per capita income is high
e. population growth rates are low

_____ 14. According to a national survey in 1970, what percent of all births were unplanned?
a. 15%
b. 25%
c. 33%
d. 44%

Part II: PRE-POST ATTITUDINAL TEST
(There are no "right" or "wrong" answers here. The tally of class answers should merely indicate attitudinal shifts during your Pop Ed instruction. Students might also survey family or community attitudes.)

a = strongly agree
b = agree
c = neutral
d = disagree
e = strongly disagree

Place the letter which best expresses your feelings next to each statement.

_____ 1. The United States is currently overpopulated.

_____ 2. The world is currently overpopulated.

_____ 3. Couples should limit their family size to two.

_____ 4. If we do not increase our population, U.S. business will suffer from lack of customers.

_____ 5. Married couples have a responsibility to limit family size.

_____ 6. Population growth causes other economic and social problems to worsen.

_____ 7. To control population, tax exemptions should be provided for only the first two children.

_____ 8. A woman's place is in the home.

_____ 9. A woman needs children to be happy.

_____ 10. Lower income families contribute more to population growth than middle income families.

_____ 11. Welfare agencies should not give aid for more than two dependent children.

_____ 12. After two illegitimate births, a woman should be sterilized.

_____ 13. A woman should be allowed to have an abortion if she wants it.

_____ 14. Having an abortion is a crime--no matter what the situation.

_____ 15. The government should set up birth control clinics and provide contraceptives to anyone who requests them.

_____ 16. Population growth in underdeveloped nations is more serious than it is in the U.S.

_____ 17. There is a population explosion in the world today.

_____ 18. There is a population crisis in the world today.

_____ 19. If underdeveloped countries do not control their population growth, the U.S. should cut off foreign aid to them.

_____ 20. The U.S. should put more money and effort into research for new, safe, and effective birth control methods.

_____ 21. People should not worry about population growth because we can always migrate to other planets.

_____ 22. People should not worry about population growth, because science and technology will find a way to solve our problems of food and energy shortages.

ANSWERS: Part I: Factual Test

1.	c	8.	f
2.	b	9.	a
3.	c	10.	c
4.	d	11.	e
5.	d	12.	d
6.	f	13.	a
7.	f	14.	d

RESOURCES

TEACHING MATERIALS

1. ENVIRONMENT AND POPULATION: A SOURCE-BOOK FOR TEACHERS. Kathryn Horsley. 1972. $3.95. National Education Association, Washington, D.C. 20036. Material relates population variables to various social and natural pressures. Includes concept statements, discussions, class activities, reference, and audio-visual material recommendations. Concepts are developed at junior and senior high school levels for infusion into courses in Contemporary Issues, Family Life, History/ Social Studies, Science, and Sociology.

2. INTERCHANGE. Judith R. Seltzer, ed., and Carol Fletcher. The Population Reference Bureau, 1337 Connecticut Ave., N.W., Washington, D.C. 20036. $2/year. A bimonthly population education newsletter containing articles, descriptions of educational materials, events in Pop Ed such as training workshops, and "Activity Sketches" for classroom use. (1st copy free.)

3. POPULATION. Valerie K. Oppenheimer. Headline Series No. 206, 1971. $1. Foreign Policy Association, Inc., 345 E. 46th Street, New York 10017. Booklet discussing trends in world population growth, demographic concepts, the problem of feeding an increasing population, environmental devastation, and family planning in developing and industrialized nations. Covers trends and attitudes relating to fertility, abortion, sterilization, women's roles, U.S. population policy at home and abroad, and population control.

4. POPULATION EDUCATION KIT. $1.50. Zero Population Growth, 1346 Connecticut Ave., N.W., Washington, DC 20036. Folder containing annotated lists of teaching materials, films, population study centers, and population-related organizations; reprints of articles and activities, World Population Data Sheet, and informative posters; and a sampling of teaching materials.

5. OPTIONS: A STUDY GUIDE TO POPULATION AND THE AMERICAN FUTURE. 1973. Kathryn Horsley, et al. The Population Reference Bureau, 1337 Connecticut Ave., N.W., Washington, DC 20036. A study guide for teachers and community leaders to explore U.S. population issues. To be used with or independent of the film, "Population and the American Future".

6. EQUILIBRIUM. January, 1974/Vol. II, #1. $1. Zero Population Growth, 1346 Connecticut Ave., N.W., Washington, DC 20036. Contains good background discussions on Population Education, as well as factual information, activities, and resources for immediate classroom use.

7. "Population: Facts and Materials for Classroom." Carl A. Huether. THE SCIENCE TEACHER, Vol. 41, #9, Dec., 1974. A ready reference for the classroom containing facts, activities, and references.

8. "Sources and Resources, Population Education." Kathryn Horsley. SOCIAL EDUCATION, April, 1972. References on readings and audio-visuals.

9. A STRUCTURE FOR POPULATION EDUCATION. 1974. Mary Turner Lane and Ralph E. Wileman. Carolina Population Center, University of North Carolina, Chapel Hill, NC 27514. One of the most thorough treatises on behavioral objectives, concepts, and curriculum, as well as appendix of references.

10. WORLD BANK ATLAS. World Bank, 1818 H St., N.W., Washington, DC 20433. A collection of data concerning national population, per capita production, and growth rates.

11. "Population Education: A Challenge for the Seventies." POPULATION BULLETIN, February, 1970. Population Reference Bureau, Inc., 1337 Connecticut Ave., N.W., Washington, DC 20036. This booklet traces the historical development of the field indicating the principal rationales for developing population education.

12. TEACHING POPULATION CONCEPTS. Pat King and John Landahl, 1976. Dolphin Enterprises, 1207 N.E. 103rd St., Seattle, WA 98125. $4.20. An excellent short teaching manual on basic population concepts for teacher and student. Elementary and secondary teaching activities are included. This booklet was originally prepared for the Office of the Superintendent of Public Instruction, in the State of Washington.

13. POPULATION EDUCATION TASK CARDS. A set of 23 cards, each of which includes a learning objective involving a population concept and a self-contained activity designed to teach the concept. Designed and field-tested by the Office of the Superintendent of Public Instruction, State of Washington. Available, Dolphin Enterprises, as above. $5.25.

14. ECO--AN ISLAND SIMULATION GAME. A 16-page booklet for an intriguing simulation game for upper elementary level incorporating a number of population/environment concepts. Field tested as above. Available from Dolphin Enterprises as above. $1.55.

15. SOURCEBOOK ON POPULATION, 1970-76. An excellent and detailed current annotated reference book on bibliography, organizations, training programs, and other information useful in the population dynamics field. Population Reference Bureau, 1337 Connecticut Ave., N.W., Washington, D.C. 20036

16. WORLD AND U.S. POPULATION CHARTS, I. Population Reference Bureau, 1337 Connecticut Ave., N.W., Washington, D.C. 20036. Charts are available annually and contain the most current demographic data on the U.S. and other nations. A cost of $3.50 for a set of eight wall charts and 10 sets of notebook-size reproductions. Section II includes world energy production, consumption and population, 1950 and 1974, age structure, status of women in the U.S. and other data. A cost of $3.00 for a set of six wall charts and 10 notebook-size sets.

17. FOOD FOR THOUGHT: A POPULATION SIMULATION KIT. Carol Fletcher and Rebecca Davidson. $3.00. A role-playing exercise in the relationships, problems and consequences involved in population growth and distribution of food with respect to land area. Available from Population Reference Bureau (address above), or Population Institute, 110 Maryland Ave., N.E., Washington, DC 20002.

18. PLANNING FOR PEOPLE: LAND USE DECISION MAKING KIT. Utilizing the state of Connecticut as a model, this self-instructional curriculum unit on population growth is one of 13 units. It deals with alternative patterns for future population growth and the role of population data in land use decision making. Data from other states can easily be substituted. $28. Environment-Population Education Services, 21 Merritt St., Hamden, CT.

19. POPULATION EDUCATION: SOURCES AND RESOURCES. Judith R. Seltzer and Jo Ann Robinson. Population Reference Bureau, 1337 Connecticut Ave., N.W., Washington, DC 20036. $1. This booklet is a comprehensive listing of population materials and organizations for teachers and community leaders.

20. POPULATION AND HUMAN DEVELOPMENT: A COURSE CURRICULUM INCLUDING LESSON PLANS, ACTIVITIES, AND BIBLIOGRAPHY. 1975. Elaine Murphy. The Population Institute, 110 Maryland Ave., N.E., Washington, D.C. 20002, 41 pp., $1.00. An outstanding multidisciplinary population course outline for advanced high school students, or training of teachers.

21. THE POPULATION EDUCATION TEACHER'S WORKSHOP PACKAGE. Urban Life-Population Education Institute, 2418 St. Paul St., Baltimore, Md. 21218. Mass Media Associates, 2116 N. Charles St., Baltimore, Md. 21218, 1976. $20.00. A curriculum tested in Baltimore city schools which applies social studies population concepts to a local situation.

22. EXPLOSION: A SIMULATION OF A SOCIETY'S STRUGGLE TO SOLVE ITS POPULATION PROBLEMS, 1980-2015. Interact, Box 262, Lakeside, CA 92040. An intriguing simulation game based upon a hypothetical disaster striking planet Earth, allowing only one land mass and group of people to survive.

23. A STUDENT'S INTRODUCTION TO ACCESSING THE 1970 CENSUS, INSTRUCTOR'S KIT FOR ACCESSING CENSUS BUREAU PRODUCTS AND SERVICES, THREE CASE STUDIES. Data User Services Div., Bureau of the Census, Washington, D.C. 20233

24. MAN AND ENVIRONMENT FOR SECONDARY SCHOOLS. National Association for Environmental Education, 5940 S.W. 73rd St., Miami, Fla. 33143. $4. A guide for developing an environmental curriculum including one module on population. Strategies for implementation included.

BACKGROUND READINGS FOR TEACHERS AND SECONDARY STUDENTS

1. THE LIMITS TO GROWTH. 1972. D. Meadows, et al. N.Y. Universe Books, available from Potomac Associates, 1707 L Street, N.W., Washington, DC 20036. $2.75. A report of an international group of scholars who conducted the first global computer model study to determine predictions of man's future based upon population growth, pollution, resource depletion, industrial output, and other parameters.

2. THE AMERICAN POPULATION DEBATE. Daniel Callahan, ed. 1971. $2.50. Doubleday, Garden City, NY. A collection of 23 articles which discuss whether or not the U.S. has a population problem and possible solutions. Various interpretations of data and numerous value positions are presented.

3. POPULATION AND THE AMERICAN FUTURE. 1972. $1.75. The commission on Population Growth and the American Future, Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402. The report of Federal Commission's two-year study on economic, social, and environmental implications of U.S. population growth. The single best representation of trends in the U.S. Also available at most bookstores in paperback.

4. THE DISECONOMICS OF GROWTH. 1973. H. V. Hodsen. $1.25. Ballantine Books, New York. A critical examination of the theory of economic growth as related to human welfare. Offers a balanced analysis of the "growthmania" of the postwar period.

5. SEEDS OF CHANGE: THE GREEN REVOLUTION AND DEVELOPMENT IN THE 1970's. BY BREAD ALONE. Both by Lester R. Brown. Praeger Publishers. Discussions of the world food-population problem.

6. "Energy Resources." M. King Hubbert. RESOURCES AND MAN, compiled by the Committee on Resources and Man, National Academy of Sciences-National Resources Council, W. H. Freeman and Co., San Francisco, 1969, pp. 157-242. A ready reference to U.S. and world resources, and resource depletion projections. Also in same publication, "Food from the Sea," W. E. Ricker, and "Food from the Land," S. B. Hendricks

7. "Are We Running Out of Fuel?" Irving Bingelsdorf. NATIONAL WILDLIFE 9:4-9. February-March, 1971. A discussion of the energy dilemma: crisis or myth?

8. THE NEXT HUNDRED YEARS. Harrison Brown, James Bonner, and John Weis. N.Y. Viking Press. 1957. A discussion of the projected trends, problems, and solutions of this century and the next.

9. "Population." TEEM 1:1-34, April, 1972. Available from T. S. Dennison and Company, Inc., 5100 W. 82nd St., Minneapolis, MN 55437. $1.50. An entire issue devoted to population.

10. WHO SHALL LIVE?: MAN'S CONTROL OVER BIRTH AND DEATH. 1970. American Friends Service Committee. N.Y. Hill and Wang. A discussion of the ethics and values surrounding birth control.

11. "Overpopulated America." Wayne H. Davis. THE NEW REPUBLIC 162:13-15. January 10, 1970. Excellent short overview article on the population dilemma.

12. "The Tragedy of the Commons." Garrett Hardin. SCIENCE 162:1243-48. December 13, 1968. A classic and unique discussion of the ethics of population limitation.

13. "Population Density and Social Pathology." John B. Calhoun. SCIENTIFIC AMERICAN 206:32, 139-146. February, 1962. Results of animal behavioral studies on overcrowding.

14. "Social Subordination, Population Density, and Mamallian Evolution." John B. Christian. SCIENCE 168:84-90. April 3, 1970. SCIENCE 170: 345-46. October 16, 1970.

15. FAMINE, 1975. William Paddock and Paul Paddock. Prentice-Hall. One of the most thorough discussions of the food dilemma in the developing nations.

16. THE POPULATION BOMB. Paul R. Ehrlich. Reprint 1975, American Reprint Co., River City Press, P.O. Box 1200, Mattituck, N.Y. 11952. A missionary appeal to resolve the population problem.

17. ABORTION. Bernard Ransil. 1969. Paulist Press. A rational theological and medical discussion of the ethics of abortion.

18. "Alternative Roles for Women." ZERO POPULATION GROWTH NATIONAL REPORTER 3:1-27. May, 1971. Zero Population Growth, 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

19. "Guiding Local Growth." EQUILIBRIUM, Vol. 1, #1. January, 1973. Zero Population Growth, 1346 Connecticut Ave., N.W., Washington, D.C. 20036. Discussion of problems of localized population distribution, and suggestions for citizenry involvement.

20. Worldwatch Paper 5: "Twenty-two Dimensions of the Population Problem." March, 1976. Lester R. Brown, Patricia L. McGrath, Bruce Stokes. $2.

21. Worldwatch Paper 8: "World Population Trends: Signs of Hope, Signs of Stress." Lester R. Brown. October, 1976. Worldwatch Institute, 1776 Massachusetts Ave., N.W., Washington, D.C. 20036. $2.

22. STRATEGY FOR SURVIVAL: AN EXPLORATION OF THE LIMITS TO FURTHER POPULATION AND INDUSTRIAL GROWTH. Arthur S. Boughey. California: W. A. Benjamin, Inc., 1976. An excellent synthesis and inquiry into the limits to growth controversy from a systems approach.

23. IN THE HUMAN INTEREST: A STRATEGY TO STABILIZE WORLD POPULATION. Lester Brown. New York: Norton, 1974. 190 pp $2.95. An excellent publication on the world food crisis.

24. WORLD WITHOUT BORDERS. Lester Brown. New York: Random House, 1973. $2.95.

25. TOWARD A STEADY-STATE ECONOMY. Herman Daly. Freeman. 1973. A refreshing new approach to economics through environmental and humanistic considerations. $4.95.

26. CROWDING AND BEHAVIOR. Chalsa Loo. New York: MSS Information Corp., 1974. $6.25. A basic must for anyone interested in the behavioral effects of crowding.

27. POPULATION AND FOOD: CRUCIAL ISSUES. National Academy of Sciences. Committee on World Food, Health, and Population. Washington, D.C. National Academy of Sciences, 1975. $4. An excellent factual resource on the population/food dilemma.

28. TIME OF FAMINES: AMERICAN AND THE WORLD FOOD CRISIS. William Paddock and Paul Paddock. Boston: Little Brown, 1976. A timely book on the world food crisis.

29. SMALL IS BEAUTIFUL: ECONOMICS AS IF PEOPLE MATTERED. E.F. Schumacher. Harper & Row. 1976. A must to accompany Herman Daly's publication for a book into the newest divergent economic/environmental thinking. $8.95.

30. ONLY ONE EARTH: THE CARE AND MAINTENANCE OF A SMALL PLANET. Barbara Ward and Rene Dubos. New York: Norton, 1972. $6.95

31. WORLD POPULATION GROWTH AND RESPONSE: 1965-1975. Population Reference Bureau, Washington, D.C. $4.00. An outstanding resource which provides a summary ten-year survey of population trends on a global basis and within selected nations.

READINGS FOR STUDENTS, GRADES 3-12

1. THIS CROWDED WORLD. Lillian B. Frankel. $1.50. Columbia Books, Inc., 915 15th St., N.W., Washington, DC 20005. Describes the population explosion, focusing on hunger, poverty, and the degraded environment. Good explanation of how populations grow. Good graphics. Grades 3-5.

2. PEOPLE. Robert C. Cook and Jane Lecht. $1.50. Columbia Books, Inc., 917 15th Street, N.W., Washington, DC 20005. Attempts to assist student in seeing population pressures such as food shortages and health problems. Good graphics. Grades 5-7.

3. THE WORLD POPULATION DILEMMA. 1972. Columbia Books, Inc., 917 15th St. N.W., Washington, DC 20005. $2. Good explanation of demographic concepts and trends. Illustrates relationships of population and nuclear war, pollution, racism, nationalism, world poverty. Secondary and Junior College.

4. THE CRUCIAL GENERATION. David B. Van Vleck. 1971. 30 pp. Optimum Population, Inc., Charlotte, VT 05445. Discussion of how babies are produced, how to prevent them, and implications of population growth.

AUDIO-VISUALS

The following materials are available for rental simply by sending a request to:

Dr. Carl A. Huether
Dept. of Biology
Univ. of Cincinnati
Cincinnati, OH 45221

Film requests should state the name(s) of the film(s) and the date(s) wanted. Preferably, alternate dates should also be stated. There is a $3 fee for each film ordered, payable immediately after the showing. Each film must be in the mail one day after it is shown in order that the next scheduled request may utilize it. There is a fine of $5 for each film returned late. As these films are in heavy demand, make requests early. Alternative commercial rental sources are listed in case of conflicts.

Asterisked films are also available from:

Zero Population Growth, Inc.
1346 Connecticut Ave., N.W.
Washington, DC 20036
(202)785-0100

Films should be requested with two alternate dates two months prior to showing date by sending a written request. The charge per film is $10. Films are available on a 3-day loan. An extensive film-holding beyond this listing is available upon request.

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1. FILMS

Film	Time	Commentary
*Population and the American Future (1972, color)	60	This excellent film details the extensive research findings and recommendations of the Presidential Commission on Population and the American Future. Illustrates trends and attitudes prevailing in America on population in an easily understandable and desirable approach. Grades 7 through college; any class by subject. (Two 30-minute reels.)
Tomorrow's World: Feeding the Billions (1968, color)	54	A special produced by NBC for television; narrated by Frank McGee. Suggests a number of new approaches to increasing the food supply--

		perhaps optimistically. Even though the film is 8 years old, many good ways to improve food production are examined. (See note under Beyond the Next Harvest.) Grades 7 through college; more oriented to science classes.
Wolves and Wolfmen (1974, color)	52	An outstanding film based upon research findings which discredits many negative myths about the wolf and emphasizes the social and human-like behavioral qualities of this intelligent animal. Increases understanding of population cycles of predator-prey relationships and of wolf as an endangered species. Grades 11 through college. Socio-behavioral and natural sciences.
Darwin's Bulldog (1972, color)	52	This film explores creationist vs. evolutionary theory as related to Darwin's Theory of Natural Selection. Illustrates how Thomas Malthus' ideas about populations directly influenced Darwin's thinking. Darwin's bulldog is Thomas Huxley who strongly defends Darwin's writing against prevailing church doctrine. Grades 11 through college; biology.
Beyond the Next Harvest (1975, color)	27	This film documents the growing world food crisis from a time of surplus, only 5 years ago, to the present global situation. Visual statements of world hunger, interviews with 1974 World Food Conference delegates (Lester Brown, Barbara Ward, Jean Mayer, and Sayed Marei) and factual narration by Norman Cousins mesh to show all nations' and peoples' concern for survival. (Note: This film, produced in 1975, in many ways is an update of Tomorrow's World: Feeding the Billions, but it is in rather sharp contrast to it. These two films can be productively used in combination to show the changes in thinking and conditions in seven years time. Also, see note under Food From the Sea, as this film (optimistic) is also

		useful to contrast with Beyond the Next Harvest (pessimistic). The two together present a good balance.
The Lorax (1972, color)	25	The wise words of the Onceler are worth listening to as he spins a fanciful tale with a serious theme: Clean up the environment before it is too late! In this delightful story the student is introduced to "Thneeds" which everyone needs. And the Lorax? Just what does he do? Only Dr. Seuss can describe this creature--which he does charmingly with typical Seussian logic. Produced by CBS, Inc. Any grade level; any class by subject.
Tragedy of the Commons (1971, color)	25	An intriguing film and teacher's guide based upon Garrett Hardin's classic article by the same title. Provides numerous illustrated arguments for population control. Film may be utilized in small discussion segments with guide. Grades 11 through college; any class by subject.
The Time of Man (1971, color)	50	An outstanding film providing strong anthropological and biological approach emphasizing human interrelationship with environment. Explores human aggression, dominance and manipulation of the environment. Provides insight into the workings of human nature. Excellent starting point for discussion in a population module. Grades 7 through college; any class by subject.
*Say Goodbye (1972, color)	50	A dynamic and emotional film illustrating the interrelationships between humans and other species. Emphasizes the right all species have to share the planet and the results of acts of human aggression which have resulted in endangered and extinct species. Grades 7 through college; any class by subject.

Population Ecology (1965, color)	19	By utilizing a simple fruitfly experiment, this film illustrates how animal populations normally grow and stabilize in response to environmental changes. Illustrates how human populations grow. (Growth rates in film are out of date, however, fine development of basic principles make the film still worth using.) Produced by Encyclopedia Britannica. Grades 7 through college; any class by subject.
Tilt (1973, color)	19	Produced by the National Film Board of Canada and the World Bank, this animated film raises questions about the distribution of wealth and food among the world's people. The world is compared to the ball in a pinball machine, bouncing this way or that according to the way it is manipulated. The forms that this may take are acted out by cartoon characters in a series of wryly amusing sketches. It is a well done film with good depth, and it should be very useful for promoting class discussions. Award: American Institute of Planners. Grades 7 through college (different levels of students will see different aspects of this film); any class by subject.
*Tomorrow's Children (1971, color)	17	Film provides strong indictment of the refusal of humans to follow nature's laws. Suggests slowing population growth through use of methods of contraception.
*Vasectomy (1972, color)	17	Presents pros and cons of the vasectomy procedure through interviews with couples who have used it. Also interviews men during the operation itself, although the procedure itself is only shown diagramatically. Grades 11 through college; any class by subject.
Boomsville (1969, color)	11	Animated film without narration depicting historical sequences of modern civilization. Grades 1 through 12.

*World Population (1972, color)	4	Outstanding graphic visualization of how population has grown and has been distributed since 1 A.D. Does so through representing dots as 1 million persons on a world map. Produced by U.S. Information Agency. Grades 7 through college; any class by subject.
*Sorry, No Vacancy (1973, color)	27	Dramatically illustrates the urgent conflict between world population growth and resource consumption by interviews with national experts.
Food From the Sea (1972, color)	17	While malnutrition and starvation continue to plague humankind, increasing as population grows, oceanographers are searching the seas for new and inexpensive sources of protein. This new science includes fish-farming to increase the yield, turning species of traditionally rejected fish into FPC (fish protein concentrate) and conservation of those species that have been overfished. Produced by Owen Lee, former member of the diving team of Jacques Cousteau's ship "Calypso," and the author of numerous books on the sea. Full length version of film awarded CINE Golden Eagle. (Note: Food From the Sea presents a rather optimistic picture of food production. Since Beyond the Next Harvest presents a more pessimistic point of view, these two films can be effective used together to present a good balance.)

II. SLIDE-TAPE PROGRAMS

The following programs consist of two slide carousels (total of 160 slides per program) with accompanying cassette tapes. The carousel slide trays are for Kodak projectors. Each program lasts approximately 45 minutes.

Slide-Tape Program	Brief Description
Biological Catastrophies: When Nature Becomes Unbalanced (1976)	That human beings have seriously disrupted cycles of nature is beyond question. However, it is equally

certain that we cannot put everything back the way it was in simpler times. Students are given framework for understanding and evaluating the vast changes created by our technological society and learn that the issues involve complex value choices. Program establishes the vital role of natural cycles in maintaining life, documents their delicate balance and illustrates ways in which people interrupt natural cycles. The narration is recorded with stops at appropriate points to provide an opportunity for class discussion. Grades 9 through 12; oriented more toward science classes.

Critical Issues in Science and Society: The Great Energy Debate (1976)

Program raises ethical issues implicit in exploiting new areas of supply of fossil fuel (e.g., Alaska Pipeline). Program points out that the development of non-fossil sources depends on complicated factors. Grades 9 through college; any class by subject.

Critical Issues in Science and Society: A World to Feed (1976)

By focusing on individual human beings in individual countries, the program helps students understand the implications of attempting to relieve world-wide food shortages. It describes how intervention to increase food supplies may also encourage population growth. Program examines the once-optimistic predictions of "farming" the sea, the side effects and high costs of the Green Revolution, the massive use of cereal grains as animal feed in this country. Finally, it points out that, while we may have the ability to feed the starving, there remains a serious question of whether we should assume responsibility. This program raises good questions for class discussion. Grades 9 through college; more oriented toward science classes.

The Science and Ethics of Population Control: An Overburdened Earth? (1976)

Program focuses on population control from two distinct points of view--personal and scientific. Part One concentrates on the question of optimum family size and how population growth affects individual lives. Part Two expands the discussion to the world level, examining dwindling resources and soaring population. Human growth

possibilities are replaced in perspective as students see how non-human populations control - or fail to control - growth. Students are encouraged to respond to some extremely mild and some extremely coercive proposals for population control Grades 9 through college; any class by subject.

Man and His Environment: In Harmony and In Conflict (1976)

Since human beings first built a fire, dammed a stream, cleared a field, they have adapted nature for their own safety and comfort. This extremely topical program warns that society is dependent on nature. This program also discusses the urban environment and our need to examine our values regarding our cities.

III. Population Inquiries: U.S. and World Dynamics
Dr. Jerry Brown
Population Education Proj., Indiana

Includes:
1) Revised Plan-A-Fam Game.
2) Two film strips:
   a) Systems Man (7 min.)
   b) Rural India: May You Have a Thousand Sons (15 min.)
3) Two volume unit on population issues for 11th and 12th grade social studies classes.

ADDITIONAL FILM SOURCES

POPULATION AND THE AMERICAN FUTURE
Official report of the President's Commission
Publisher - Fisher Film Group

TOMORROW'S WORLD: FEEDING THE BILLIONS
Contemporary McGraw-Hill - $30.00
McGraw-Hill Film Library
Princeton Road
Hightstown, NJ 08520

WOLVES AND WOLFMEN
Indiana University - $19.50
Audio-Visual Center
Bloomington, IN 47401

University of Michigan - $17.00
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

DARWIN'S BULLDOG: T. H. HUXLEY & THE FIGHT FOR DARWINISM

University of Illinois - $19.50
Visual Aids Service
1325 S. Oak
Champaign, IL 61820

Time-Life - $55.00
Distribution Center
100 Eisenhower DRive
Paramus, NJ 07652

THE LORAX

Indiana University - $12.50
Audio-Visual Center
Bloomington, IN 47401

University of Michigan - $9.50
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

Kent State University - $10.50
Audio-Visual Services
Kent, OH 44240

TRAGEDY OF THE COMMONS

Indiana University - $12.00
Audio-Visual Center
Bloomington, IN 47401

University of Illinois - $11.00
Visual Aids Service
1325 S. Oak
Champaign, IL 61820

TIME OF MAN

University of Michigan - $17.00
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

SAY GOODBYE

Kent State University - $8.50
Audio-Visual Services
Kent, OH 44240

University of Michigan - $17.00
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

POPULATION ECOLOGY (EBF, EBEC)

University of Southern California - $7.00
Film Distribution Center
Division of Cinema
University Park
Los Angeles, CA 90007

Kent State University - $8.50
Audio-Visual Services
Kent, OH 44240

Indiana University - $10.75
Audio-Visual Center
Bloomington, IN 47401

University of Michigan - $8.25
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

Syracuse University - $11.75
Film Rental Center
1455 E. Colvin Street
Syracuse, NY 13210

POPULATION ECOLOGY (McGH)

Kent State University - $12.50
Audio-Visual Services
Kent, OH 44240

Syracuse University - $8.00
Film Rental Center
1455 E. Colvin Street
Syracuse, NY 13210

University of Michigan - $8.50
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

TILT

University of Southern California - $10.00
Film Distribution Center
Division of Cinema
University Park
Los Angeles, CA 90007

Kent State University - $8.50
Audio-Visual Services
Kent, OH 44240

University of Illinois - $9.50
Visual Aids Service
Champaign, IL 61820

TOMORROW'S CHILDREN

Indiana University - $9.25
Audio-Visual Center
Bloomington, IN 47401

University of Michigan - $7.35
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, MI 48103

VASECTOMY

Indiana University - $9.25
Audio-Visual Center
Bloomington, IN 47401

Kent State University - $8.50
Audio-Visual Services
Kent, OH 44240

BOOMSVILLE

Kent State University - $5.50
Audio-Visual Services
Kent, OH 44240

University of Illinois - $6.75
Visual Aids Service
1325 S. Oak
Champaign, IL 61820

Syracuse University - $7.00
Film Rental Center
1455 E. Colvin Street
Syracuse, NY 13210

WORLD POPULATION

Kent State University - $5.50
Audio-Visual Services
Kent, OH 44240

FOOD FROM THE SEA

Kent State University - $7.00
Audio-Visual Services
Kent, OH 44240

University of Illinois - $6.15
Visual Aids Service
1325 S. Oak
Champaign, IL 61820

Syracuse University - $11.00
Film Rental Center
1455 E. Colvin Street
Syracuse, NY 13210